

A Study of the Prevalence of Anemia among Women Attending Ibn Sina Teaching Hospital in the City of Sirte

Intisar H. Abdullah

Department of Zoology, Faculty of Science, Sirte University, Libya

Abstract: Anemia conditions in which hemoglobin (HB) concentration and red blood cell (RBCs) numbers are lower than normal and insufficient to meet individual's physiological needs affects roughly one-third of the words population. This study aimed to investigate prevalence of anemia among women attending Ibn-Sina teaching hospital – Sirte/Libya. Also the current study conducted survey of 100 case housed in hospital during months – six (June–November/2022), age 15-90 years old. The cases were interviewed and forms were developed to record their relevant data such as age, the medical history of family for chronicle diseases and complete blood count (CBC) (patient files). The results showed that 66% from the cases were infected with anemia among women, severe anemia, moderate and mild were respectively 28.8%, 30.3%, 40.9%. The anemia was the most prevalent among the women aged 15-90 years. Moreover, chronicle diseases, pregnancy, miscarriage, disorders of thyroid gland, renal failure, menstrual problems, nutrition multiple births one of the main causes of anemia in this study.

Key words: Anemia, Hemoglobin, Ibn-Sina teaching hospital, Complete blood count.

1. Introduction

Anemia is defined as a condition in which the level of hemoglobin in the blood is lower than the normal rate (less than 11 g/100 ml of blood) according to the world health organization rate [1]. Anemia is also a global problem that affects people of all ages, it leads to a decrease in the oxygen-carrying capacity of RBCs, causing chronic fatigue, ill health, pallor hypotension, head ache and edema being the most common symptoms of anemia. General clinical findings may be characteristically associated with a particular type of anemia. Women of childbearing age who are not pregnant are the third most affected group, after pre-school children and pregnant women. Anemia also has several causes, the most important of which are iron deficiency, deficiency of micronutrients (such as folic acid and riboflavin, vitamin B12), acute and chronic infection, inherited and acquired disorders of hemoglobin synthesis or red blood cell production [2, 3].

1.1 Types of Anemia

- Iron Deficiency Anemia

Iron is essential for the various activities of the human body especially in the heamoglobin synthesis. Iron deficiency anemia is a condition in which the body has too little iron in the bloodstream and is more common in teenage girls and premenopausal women.

Iron levels can be low for a variety of reasons, including blood loss from heavy menstruation, internal bleeding from the gastrointestinal tract. Or donating a large amount of blood [4] as well as pregnancy and growth spurts in childhood poor absorption of iron, nutritional factors in the diet, medications such as aspirin and ibuprofen, kidney bleeding, red blood cell problems, bone marrow problems [5].

- Pernicious Anemia

Pernicious anemia is the most common results of vitamin B12 deficiency, as vitamin B12 deficiency leads to anemia and other problems. Pernicious anemia usually develops after the age of fifty and affects women more than men, as it occurs more often in people who suffer from autoimmune diseases. It

Corresponding author: Intisar H. Abdullah, Lecturer, research fields: general animal physiology, blood and immunology. Email: intisar22h@su.edu.ly.

may some of the medications used also affect the absorption of vitamin B12 such as metformin [6].

- **Sickle Cell Anemia**

Where red blood cells contain abnormal haemoglobin that causes their sickle shape, they cannot move easily through the blood vessels. Sickle cells block blood flow to limbs and organs, causing pain, severe infection, and organ damage. Sickle cells typically die after about 10 to 20 days. The body can not produce new red blood cells fast enough to replace dead cells, which causes anemia [4].

- **Thalassemia**

Thalassemia is an inherited blood disorder that causes the body to produce abnormal red cells and reduce hemoglobin. There are two type of thalassemia alpha and beta thalassemia. Thalassemia affects both males and females, hemoglobin in red blood cells contains chains protein, α -globin and β -globin, if the body does not produce enough of these chains, then the red blood cells are not formed properly and can not carry enough oxygen the genes control the formation of these chains. When these genes are missing or altered, thalassemia occurs [4]

- **Aplastic Anemia**

Aplastic anemia is a blood disorder in which the bone marrow can not produce enough new blood cells. This can lead to many health problems such as irregular heartbeat, enlarged heart, heart failure, infections and bleeding [7]. Many diseases, condition, and acquired factors can cause a plastic anemia, including toxins such as pesticides, benzene, radiation,

chemotherapy, infections diseases such as hepatitis, cytomegalovirus, HIV, autoimmune disorders such as arthritis [8].

- **Anemia Caused by a Deficiency of Folic Acid**

Anyone who suffers from this type of anemia is due to not getting enough folic acid (vitamin B9). Anemia caused by a lack of foods containing folic acid can lead to malnutrition and stomach problems. During pregnancy, the fetus absorbs a lot of folic acid from the mother [9].

- **Pregnancy Anemia**

Pregnancy anemia is defined as hemoglobin below 110 g/L during the first and last trimesters of pregnancy, and below 105 g/L in the second trimester. Women with anemia or iron deficiency may suffer from symptoms that are fatigue, low energy levels, decreased mental performance, shortness of breath, and paleness. Acute anemia is associated with premature delivery, low birth weight, and short stature during and after birth [10].

2. Material & Methods

2.1 Samples Collection

This study was conducted on 100 samples of women attending Ibn Sina Teaching Hospital in Sirte, and their ages ranged between 15-90 years, both married and unmarried, during the period from June to November 2022. The samples members were divided into three groups according to age (15-35; 36-50; 51-90), as shown in Table 1.

Table 1 The distribution of infected women according to age groups.

	Age categories (years)	Number of people	Number of anemia	The ratio
The first group	15-35	40	27	40.9%
The second group	36-50	28	17	25.8%
The third group	51-90	32	22	33.3%
Total	-	100	66	100%

All study samples underwent a complete blood count test (CBC).

2.2 Statistical Analysis

The data were expressed as mean $\pm$ standard error. Data were analyzed by using statistical program of social science (SPSS) software for windows V17 (SPSS, 1999), the means were compared by significant difference test (t-test); the values are significant when P value is less than 0.05.

3. Results

This study was conducted to find out the prevalence of anemia among women attending Ibn Sina Teaching Hospital in Sirte, who were accommodated in the

Department of Obstetrics and Gynecology, the Department of Internal Medicine for women and the Department of Surgery & Kidneys for women.

During the period from June to November 2022, where data were collected for 100 samples from patient files in the aforementioned sections, including age, complete blood count (CBC), hemoglobin values (HB) (Fig. 1), red blood cells count (RBCs) (Fig. 2), white blood cells count (WBCs) (Fig. 3), hematocrit values (HCT) (Fig. 4), and platelets count (PLT) (Fig. 5). And why they were admitted and whether they had a chronic illness.

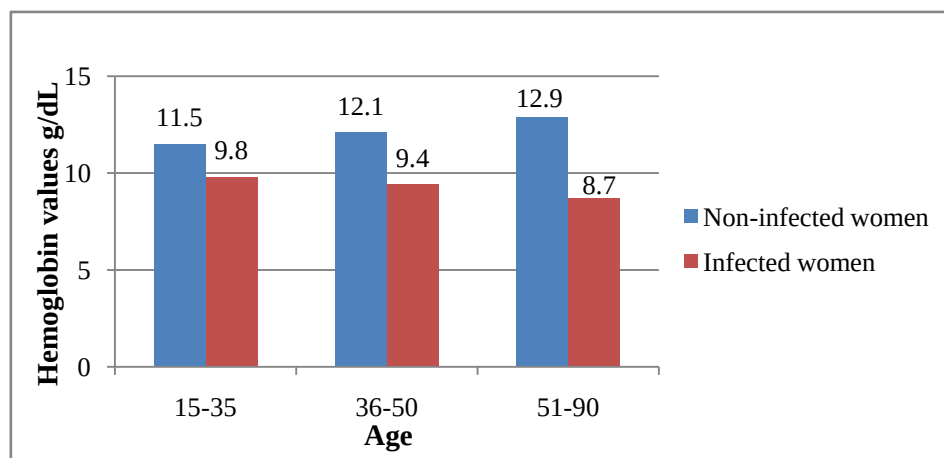


Fig. 1 Average hemoglobin values among the study sample.

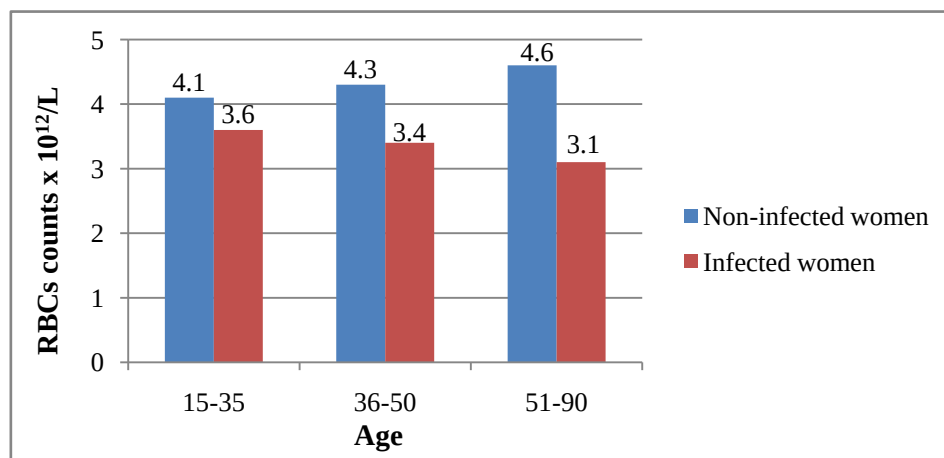


Fig. 2 Average RBCs count among the study sample.

A Study of the Prevalence of Anemia among Women Attending Ibn Sina Teaching Hospital in the City of Sirte

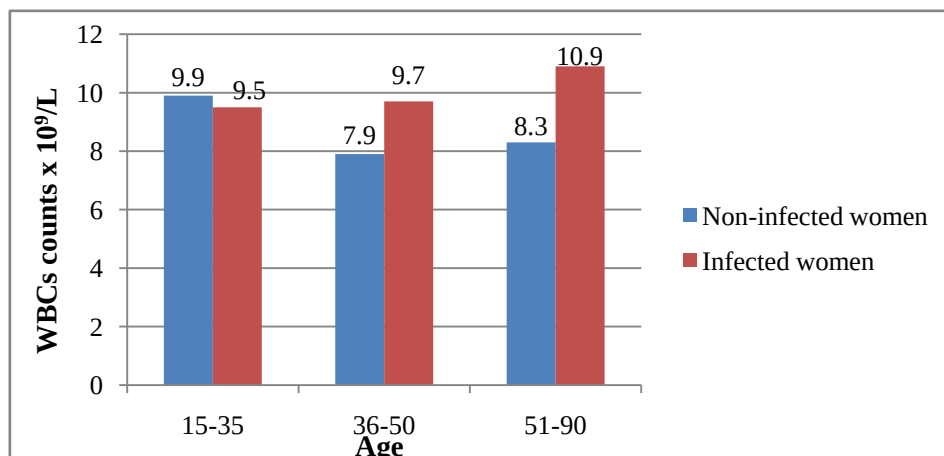


Fig. 3 Average WBCs count among the study sample.

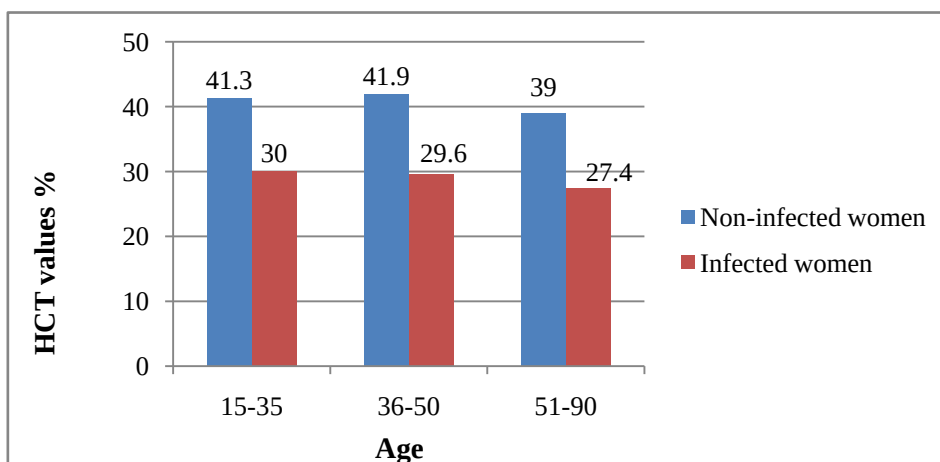


Fig. 4 Average HCT values among the study sample.

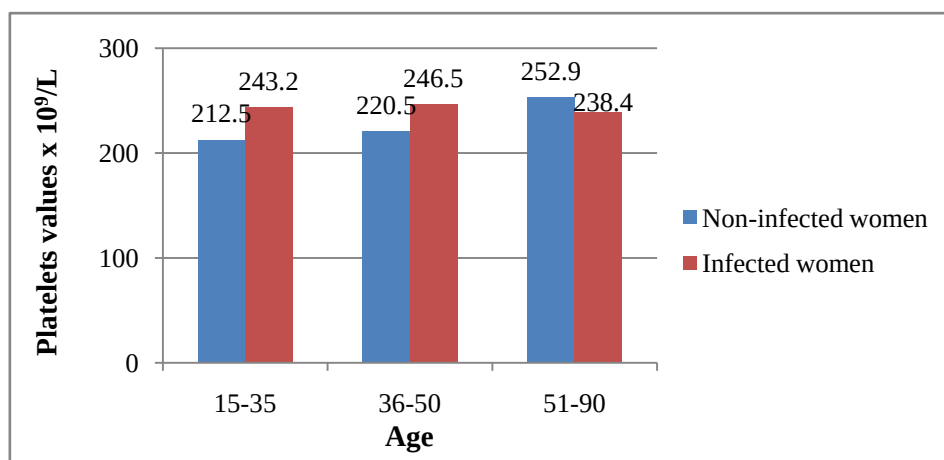


Fig. 5 Average PLT count among the study sample.

The number of women with anemia among the study samples was 66, or 66% of the total number of cases (Table 1). Among the anemic female samples, there

were 27 cases of mild anemia, 20 cases of moderate anemia, and 19 cases of severe anemia, as detailed in Table 2.

Table 2 Showing the degree of anemia in infected women by age group.

Age (years)	Mild anemia		Moderate anemia		Severe anemia	
	Number of people	proportion	Number of people	proportion	Number of people	proportion
15-35	17	25.8%	6	9.1%	4	6.1%
36-50	7	10.6%	6	9.1%	4	6.1%
51-90	3	4.5%	8	12.1%	11	16.6%
Total	27	40.9%	20	30.3%	19	28.8%

As shown in Table 3, a significant decrease of $P > 0.05$ was observed in HB values, HCT values for samples of infected women in the three age groups, and this decrease was more evident in the age group 51-90 years compared to non-infected women of the same age. While significant increase in the number of white blood cells was recorded for sample of infected women whose age ranged between 36-50 and 51-90 years. There was no significant change in white blood cell values in infected women in this age group (15-35 years) compared to uninfected women of the same

age.

It was also noted a significant increase in the number of blood platelets in infected women, whose ages ranged between 15-35 and 36-50 years, and a decrease in the third affected group (51-90) years, compared with non-infected women of the same age. This study also showed that there is a decrease, but not significant, in the number of red blood cells in the three age groups compared to non-infected women of the same age. The number of cases of anaemia in each department of Ibn Sina Hospital is shown in Table 4.

Table 3 The difference in the mean of hematological variables and the standard deviation between infected and non-infected women.

Parameter	G1 (15-35 years); N = 40		G2 (36-50 years); N = 28		G3 (51-90 years); N = 32	
	Infected (n = 27)	Non-infected (n = 13)	Infected (n = 17)	Non-infected (n = 11)	Infected (n = 22)	Non-infected (n = 10)
HB (g/dL)	0.220 [*] ± 9.8	11.15 ± 0.11	9.4 ± 0.286 [*]	12.19 ± 0.30	8.7 ± 0.292 [*]	12.98 ± 0.32
RBCs (x 10 ¹² /L)	3.6 ± 0.099	4.1 ± 0.12	3.4 ± 0.1711	4.3 ± 0.13	3.1 ± 0.126	4.66 ± 0.107
WBCs (x 10 ⁹ /L)	9.5 ± 0.621	9.9 ± 1.42	9.7 ± 1.292 [*]	7.6 ± 0.92	10.9 ± 1.763 [*]	8.32 ± 0.82
HCT (%)	30.05 ± 0.813 [*]	41.3 ± 6.8	29.6 ± 1.079 [*]	41.9 ± 4.9	27.4 ± 1.092 [*]	39.01 ± 0.92
PLT (x 10 ⁹ /L)	243.2 ± 16.93 [*]	212.5 ± 23.44	246.5 ± 27.75 [*]	220.5 ± 22.07	238.4 ± 19.9 [*]	252.9 ± 35.4

* significant ($P < 0.05$) as compared infected women with non-infected women in the three age groups.

**significant ($P < 0.05$) as compared infected women with non-infected women in G3.

Table 4 The number of anemic cases distributed to departments in Ibn Sina Hospital.

Numbers of cases	The department
28	Obstetrics and Gynecology
26	Internal Medicine
9	The Surgery
3	The Kidney

Studies have also shown that most causes of anaemia in women are miscarriages and multiple births, chronic diseases such as iron deficiency and diabetes, as well as thyroid disease - which have been observed in internal medicine, women and childbirth cases between the ages of 15-35 and 36-50. As for the

cases of kidney and surgery, the cause of anemia is the patient's renal failure, bleeding, and blood loss. Most of these cases are between 51-90 years old.

4. Discussion

The results of this study showed that there were 66

cases of anemia among women in the study sample of 100, whose ages ranged between 15-90 years. Among these women there were 19 cases of severe anemia, with a rate of 28% of the total number of infected samples, according to the report of the world health organization, that less than 5% is considered the prevalence of anemia as normal and does not represent any health problem.

Since the degree of infection prevailing in this study is mild at 41% of total number of infected cases in sample, the prevalence rate of mild anemia among women in the study sample constitutes a health problem compared to the classification previous studies of the world health organization, and this differed with previous studies, [11, 12] in Libya and another in Egypt on pregnant women, where the infection rate was 37%.

The results also show that in Table 2, by age group, women aged 51-90 have the highest degree of severe anemia (16.6%), followed by patients aged 15-35 and aged 36-50, with a proportion of 6.1%. Among people aged between 51 and 90, the main causes of severe anemia were thyroid disorders and chronic disorders, especially diabetes. This is consistent with a study conducted on diabetic patient to find out the prevalence of anemia and its causes [12], and a study conducted on patient with kidney failure in the cities of Sabratha and Sorman [13].

The results of this study were identical to many studies that indicated the existence of anemia, the blood of patient with chronic renal failure, and this due to a deficiency in the secretion of the hormone erythropoietin which is responsible for stimulating the formation of red blood cells in bone marrow [14, 15]. And one of the important reasons for the decrease in hemoglobin concentration is the deficiency of iron, which is included in the chemical composition of the hemoglobin molecule. Deficiency occurs due to malnutrition, which suffers from renal failure, and inhibition of iron absorption from the intestine due to high immune cytokines [16]. The accumulation of

nitrogenous waste in the blood inhibits the production of red blood cell-generating cells. Whereas, women over the age of forty suffer from anemia due to iron deficiency resulting from bleeding in the stomach and intestines as a result of taking some medications and anti-inflammatory drugs or having ulcers or cancer. As for women of childbearing age, they suffer from anemia as a result of menstrual disorders, pregnancy, malnutrition, and not getting enough iron through food, and this is what our current study and previous studies have reached [13].

This study also showed an increase in the number of white blood cells in women with anemia, especially in the age group 51-90 years. White blood, especially phagocytic, is depleted due to inflammatory conditions resulting from kidney disorders, as well as dialysis operations that a patient with kidney failure undergoes, and this is consistent with a study [13].

In addition, the decrease in the number of platelets in women with anemia, whose ages ranged between 51-90 years, was due to the infection of these women with renal failure, which causes an increase in nitrogenous waste and a decrease in the level of the hormone thrombopoietin in the patients' blood, which hinders the process of platelet formation in the blood. This is consistent with several studies [13, 17-19].

Our study found that anemic women aged between 15 and 50 years have higher platelet counts compared to non infected women of the same age, which can be explained by the fact that these women suffer from anemia caused by iron deficiency or other causes, and that they do not suffer from chronic diseases. As we mentioned earlier, this can affect the bone marrow. The thyroid gland plays a very important role in the overall body metabolism, including blood formation. Blood disorders are often observed in patients with thyroid disorders because the hormones of this gland have an important role in the reproduction and metabolism of red blood cells and all other blood elements [20, 21]. Where different types of anemia can be observed in thyroid patients, and iron

deficiency anemia is the most common type among these patients [22]. Red blood cells in the bone marrow, and a decrease in oxygen supply to various tissues [23, 24].

Women are considered more susceptible to thyroid disorders than men. The weakness of the thyroid gland affects all blood measures because some women, especially those over 40, suffer from thyroid disorders, and hypothyroidism causes many health problems for women, the most important of which is anemia resulting from iron deficiency, as well as heavy menstruation. We came to this conclusion in our current study, which is consistent with previous research [21, 23].

Our research also shows that compared with other ages (15--35; 36-50), most blood changes (HB, RBC, WBC, HCT, PLT) in the age group (51-90) are more clear and important. This can be explained by the fact that most of the study samples for acute anemia are concentrated in the age group of 51 to 90 years.

References

- [1] Jufar, A. H., and Zewde, T. 2014. "Prevalence of Anemia among Pregnant Women Attending Antenatal Care at Tikur Anbessa Specialized Hospital, Addis Ababa Ethiopia." *Journal of Hematology & Thromboembolic Diseases* doi: 10.4172/2329-8790.1000125.
- [2] WHO, Reproductive Health Indicators: Guidelines for Their Generation, Interpretation and Analysis for Global Monitoring, WHO, Geneva, Switzerland, (2006).
- [3] Petry, N., Olofin, I., Hurrell, R. F., et al. 2016. "The Proportion of Anemia Associated with Iron Deficiency in Low, Medium, and High Human Development Index Countries: A Systematic Analysis of National Surveys." *Nutrients* 8 (11): 693.
- [4] Soundarya, N., and Suganthi, P. 2016. "A Review on Anaemia – Types, Causes, Symptoms and Their Treatments." *Journal of Science and Technology Investigation* 1 (1): 10-17.
- [5] Harper, J. L., Marcel, E. C., and Emmanuel, C. B. 2015. "Iron Deficiency Anemia: Practice Essentials, Pathophysiology and Etiology." Medscape.
- [6] Turner, M. R., and Talbot, K. 2009. "Functional Vitamin B12 Deficiency." *Pract Neurol* 9 (1): 37-41.
- [7] Scheinberg, P., and Young, N. S. 2012. "How I Treat Acquired Aplastic Anemia." *Blood* 120 (6): 1185-96.
- [8] Brodsky, R. A. and Jones, R. J. 2005. "Aplastic anaemia." *Lancet* 365 (9471): 1647-56.
- [9] What is Folic Acid Deficiency Anemia? Available at: <https://www.webmd.com/a-to-z-guides/folic-acid-deficiency-anemia>.
- [10] Muñoz, M., Peña-Rosas, J. P., Robinson, S., et al. 2018. "Patient Blood Management in Obstetrics: Management of Anaemia and Haematinic Deficiencies in Pregnancy and in the Post-partum Period: NATA Consensus Statement." *Transfus Med* 28 (1): 22-39.
- [11] Fathia Al-arif et al., 2020. "The Causes of Anemia in Pregnant Libya Women Attending the Obstetrics and Gynecology Department at Sabratha Teaching Hospital." (in Arabic) *Journal of Applied Sciences* 3 (2): 163-178. <https://doi.org/10.47891/sabujas.v3i2.163-178>.
- [12] Milad, A. M., Milad, E., Awenis, A. A., and Abubaker, H. 2010. "Prevalence of Anemia among Diabetes Patients in Brack – Libya." (in Arabic) (*Research and Applied Sciences*) 9 (2): 13-18.
- [13] Sakina and Asma (2019) "A Study of Some Physiological Changes Associated with Chronic Renal Failure and Their Negative Effects on Patients with Renal Failure." *Journal of the College of Education, Al-Zawiya University* (14) pp. 340-341.
- [14] Brunelli, S. M., and Berus, J. S. 2009. "Anemia in Chronic Kidney Disease and End-Stage Renal Disease." *Nephrology Rounds* 7 (8): 1-6.
- [15] Erslev, A. J., and Besarab, A. 1997. "Erythropoietin in the Pathogenesis and Treatment of the Anemia of Chronic Renal Failure." *Kidney Int* 51 (3): 622-30.
- [16] Kausz, A. T., Obrador, G. T., and Pereira, B. J. 2000. "Anemia Management in Patients with Chronic Renal Insufficiency." *Am J Kidney Dis* 36 (6 Suppl 3): S39-51.
- [17] Remuzzi, G. 1989. "Bleeding Disorders in Uremia: Pathophysiology and Treatment." *Adv Nephrol Necker Hosp* 18: 171-86.
- [18] Kopple, J. D., Kalantar-Zadeh, K., and Mehrotra, R. 2005. "Risks of Chronic Metabolic Acidosis in Patients with Chronic Kidney Disease." *Kidney Int Suppl* 67 (95): S21-7.
- [19] Altum, B., Arici, M., Haznedaroglu, I. C., et al. 1999. "Serum Thrombopoietin Levels in Haemodialysis Patients : Involvement of Arteriovenous Fistula." *Nephrol Dial Transplant* 14 (9): 2173-7.
- [20] Jafarzadeh, A., Poorgholami, M., Izadi, N., et al. 2010. "Immunological and Hematological Changes in Patients with Hyperthyroidism or Hypothyroidism." *Clin Invest Med* 33 (5): E271-9.

- [21] Chandel, R. S., Ghattejee, G., and Abichandani, L.G. 2015. "Impact of Subclinical Hypothyroidism on Iron Status and Hematological Parameters." *Ann Pathol Lab Med* pp. A21-A25.
- [22] Szczepanek-Parulska, E., Hernik, A., and Ruchała, M/ 2017. "Anemia in Thyroid Diseases." *Pol Arch Intern Med* 127 (5): 352-360.
- [23] Schindhelm, R. K., Boekel, E., Heima, N. E., et al. 2013. "Thyroid Hormones and Erythrocyte Indices in a Cohort of Euthyroid Older Subjects." *Eur J Intern Med* 24 (3): 241-4.
- [24] Soliman, A. T., De Sanctis, V., Yassin, M., et al. 2017. "Chronic Anemia and Thyroid Function." *Acta Biomed* 88 (1): 119-127.