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REVIEW ARTICLE

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## Breast Cancer Related Anaemias

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### ABSTRACT

*Breast cancer is the most frequently diagnosed and the leading cause of cancer death in women globally. Over the past few decades its incidence has increased but a fall in mortality has been observed due to improvement in survival which is associated with earlier disease detection. This is a prospective cross-sectional descriptive study based on laboratory data of (136) patients with breast cancer carried out from (2012-2017) in Nuclear Medicine and Cancer Research centre - Shendi University and Nuclear Medicine and Cancer Research Centre - Aljazeera University. The investigations were performed on venous blood sample drawn in EDTA container for complete blood count by using auto haematology analyzer (Mindray BC-3000 plus). Regarding anemia among breast cancer, 61/136 (44.9 %) were anemic, while 75/136 (55.1 %) were non anemic. There is high frequency of cancer related anaemia in breast cancer (44.9 %).*

**Keywords:** Breast cancer, Anaemia and Sudan.

### INTRODUCTION

Breast cancer is a major public health problem in both developed and developing countries (Parkin et al., 2005) with more than one million new cases diagnosed annually (Pisani et al., 2002). Breast cancer remains a common and frequency fatal disease, the most commonly diagnosed cancer in women and second ranking cause of cancer death in Eastern Mediterranean Region. More than (1.2

million) women are diagnosed with breast cancer annually worldwide. In developed countries, most patients (>80%) with breast cancer present with operable disease that can apparently be entirely resected surgically (Beeson and Lippman).

Breast cancer incidence is highest in the more developed regions of the world, in urban populations, and in Caucasians women. The globocan database for 2002, indicates that age standardized rate (ASR) of breast cancer incidence is (67.8/100000) in the more developed regions (Europe, Australia, New Zealand, North America and Japan) compared with (23.8/100000) in the less-developed regions (Africa, Central America, South America, all region of Asia except Japan, the Caribbean, Melanesia, Micronesia and polynesia) (Parkin et al., 2005).

Anaemia is a general term meaning a lack of red blood cells in the circulation and there are many possible ways in which anaemia can arise. This can be the result of many reasons or factors such as lack of folic acid, iron, or B12 vitamin. Lack of red blood cells makes it difficult to carry oxygen in the different parts of the body through blood. This is because the chief function of the red blood cells is to supply oxygen to the different parts of the body. As red cells have the job of transporting oxygen around the body, anaemia is one of the common causes of breathlessness and tiredness (Dan et al., 2010).

## MATERIAL AND METHODS

This is a prospective cross-sectional descriptive study based on laboratory data of (136) patients with breast cancer carried out from (2012-2017) in Nuclear Medicine and Cancer Research centre - Shendi University and Nuclear Medicine and Cancer Research Centre - Aljazeera University- Sudan. The investigations were performed on 2.5 ml of venous blood sample drawn in EDTA container for complete blood count by using auto haematology analyzer (Mindray BC-3000 plus).

## RESULTS

The age of women in the study was ranged between (17 to 85) years with mean of (50.2) years, most of study populations were in the age between thirty to sixty years old as demonstrate in (figure 1).

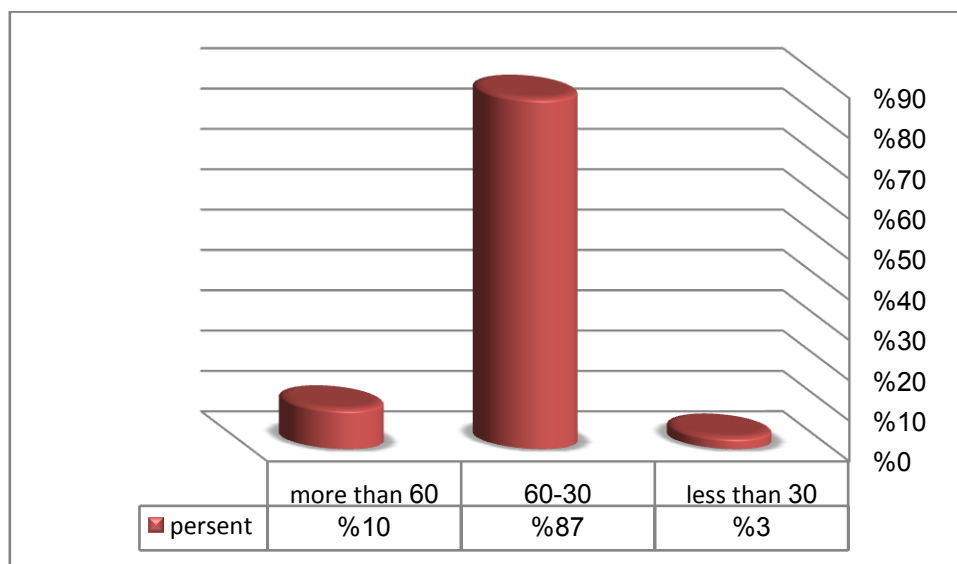


Figure 1. Distribution of age per years among study group.

Regarding anemia among breast cancer, 61/136 (44.9%) were anemic, while 75/136 (55.1%) were non anemic as shown in (figure 2).

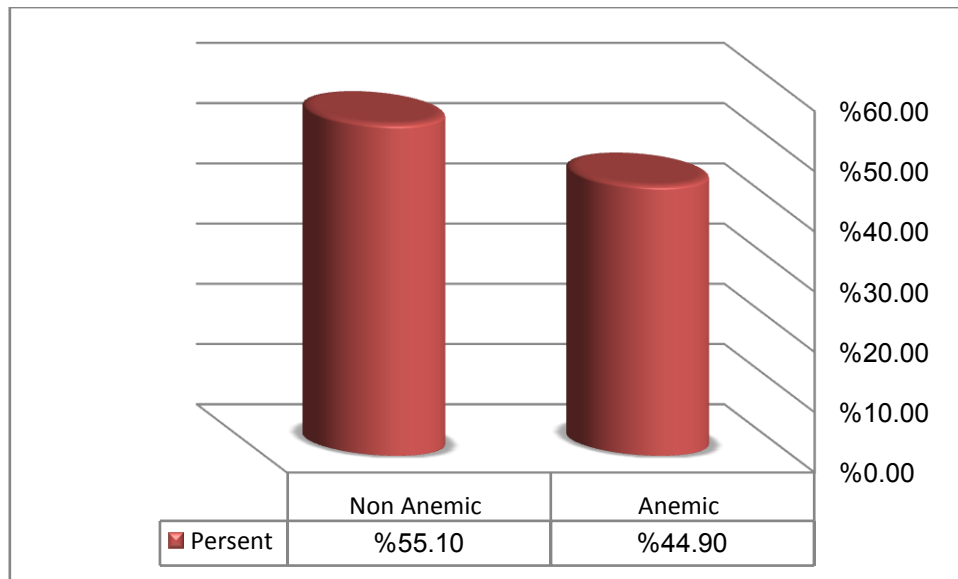


Figure 2. Anaemic status among breast cancer patients.

Most of anaemia frequency was in the age between thirty to sixty years old as demonstrate in (table 1).

Table 1. Anaemic status according to the age.

Anaemic status	Less than 30 years	30 – 60 years	More than 60 years
Anaemic	3.6%	73.2%	23.2%
Non anaemic	3.1%	71.9%	25.0%

As illustrated in (figure 3) most anaemic patients were in the third disease stage.

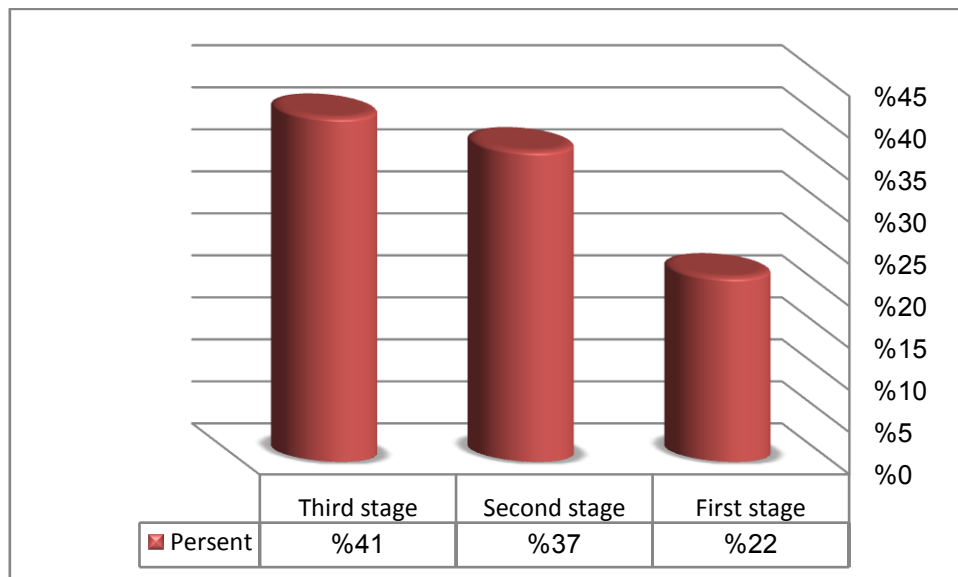
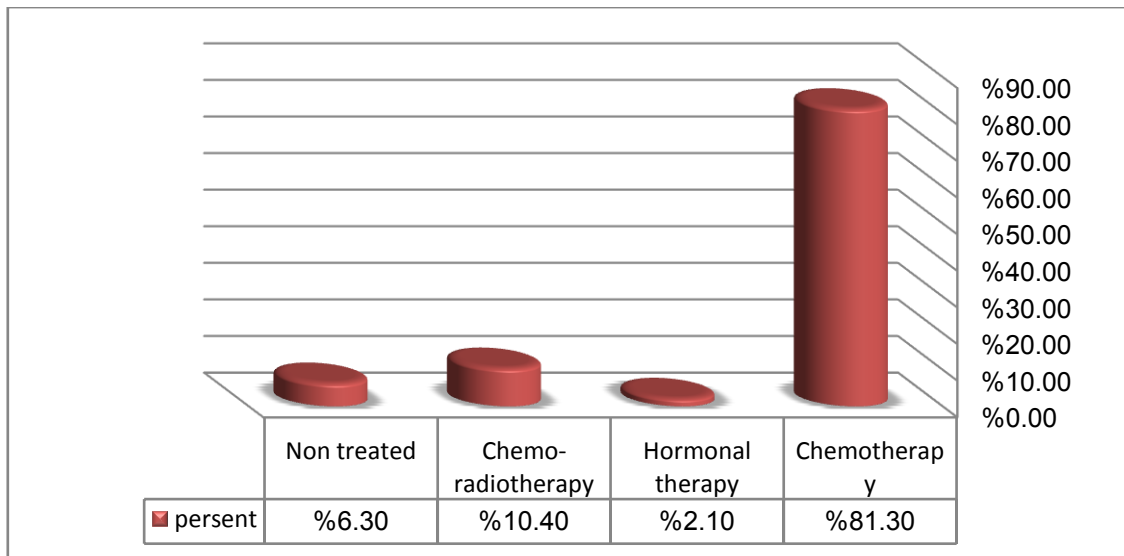


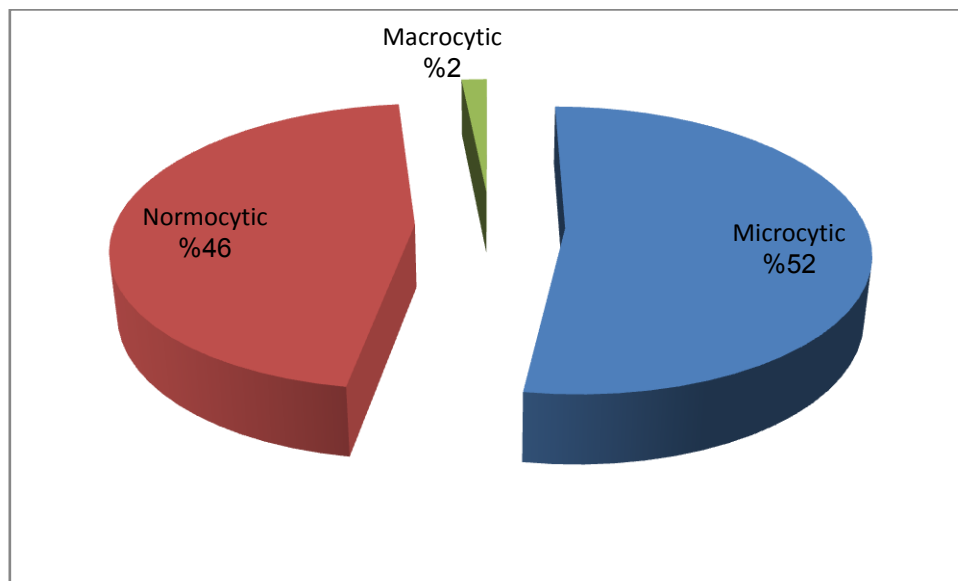
Figure 3. Frequency of anaemia according to the disease stage.

As demonstrated in (figure 4) most anaemic patients under chemotherapy treatment with (81.3%).



**Figure 4. Frequency of anaemia according to the type of therapy.**

Regarding the distribution of types of anaemia in breast cancer, the microcytic was 52%, while normocytic was 46% and macrocytic was 2% as displayed in (figure 5).



**Figure 5. Types of anaemia among breast cancer patients.**

## DISCUSSION

Breast cancer is the most frequently diagnosed and the leading cause of cancer death in women globally. Over the past few decades its incidence has increased but a fall in mortality has been observed due to improvement in survival which is associated with earlier disease detection, a multidisciplinary approach to treatment and biological changes that have made the disease more susceptible to hormonal therapy.

More than 30% of cancer patients have Cancer related anemia (CRA) at the time of diagnosis (Ludwig et al., 2004) and thus before starting any anti neoplastic treatment. Cancer-associated anemia was shown to reduce survival of patients regardless of tumor type (Caro, 2001).

The present study reveals that the majority of patients with breast cancer were in the mean age of (50.2) years. It was found that they were similar to that reported in other studies from Arab countries including (48.49) years in Saudi Arabia (Jamal, 2001), (49) years in Jordan (Aghassi-Ippen et al., 2002), (49) years in Lebanon (Alsanabani, 2015) and (48) years in Egypt (Elatar, 2002). These

figures are lower than the mean age of breast cancer in the West countries which is around 60 years (Jemal et al., 2010).

#### **The current study demonstrates three major observations**

(1) The frequency of anaemia in the study group representing 61/136 (44.9%) (Most of anaemia frequency was parallel with the age of the study population as the majorities were in the age between thirty to sixty years old), this association between the anaemia frequency and patients age may be due to increasing frequency of breast cancer with in this age. From the European Cancer Anemia Survey prospective study in 2001, (62%) of the 3,278 patients with breast cancer developed anemia at least once during the study follow-up period. The frequency of anemia obtained in this study was lower than those reported in Nigerian people as reported by Akinsegun and his colleagues (Akinbami et al., 2012). Similar frequency of anaemia was obtained by Jeffrey and his colleagues in USA (Kirshner et al., 2004) and nearly to those obtained by Amrit Pal Singh Rana and his colleagues in India (Rana et al., 2015).

(2) In correlation of frequency of anaemia to the stage of breast cancer, the results of this study showed that anaemia was found in (22) % of patients with first stage of disease, while in second stage and third stage was (37%) and(41% respectively). It was clear the majority of anemic patients were in advanced stages, this may be due to many possible reasons include blood loss from surgery, iron deficiency anemia and possibly anemia of chronic disorders as a result of their cancer in addition to impaired reaseal iron from stores. Our finding show similarity with others studies conducted in India by Swati Shrivastava and his colleagues, and Jeffrey and his colleagues in USA (Shrivastava et al., 2016) and A. Maccio and his colleagues in Italy (Madeddu et al., 2014).

(3) In relationship between frequency of anaemia and types of treatment, the present study revealed that the frequency of anaemia was (81.3%) in patients on chemotherapy, followed by (10.4%) in patients on chemo-radiotherapy. In patients on hormonal therapy anaemia was affecting only (2.1%), while in non treated cases the frequency of anaemia was (6.3%). Patients in chemotherapy showed high frequency of anaemia this may be due to chemotherapy-induced myelosuppression or primarily due to infiltration and destruction of bone marrow by malignant cells. A number of investigators have suggested an association between haemoglobin level during chemotherapy and local relapse-free survival in predicting breast cancer outcome (Dubsky et al., 2008). Many other studies conducted on breast cancer patients have shown similar findings including study conducted in India by Swati Shrivastava and his colleagues and Jeffrey and his colleagues in USA and A. Maccio and his colleagues in Italy. This evidence appears to warrant earlier evaluation of anemia and an intervention in the pre-chemotherapy stages. Chemotherapy induced anemia can be treated with erythropoiesis stimulated agents, RBC transfusions.

Others finding of current study demonstrate that the majority of anaemic patients have microcytic hypochromic picture, which coexist with cancer related anaemia (CRA) that have haematologic features similar to those observed in chronic inflammatory disease related anemia especially, the ferritin was in high level. The etiology of CRA is multifactorial, but the major contributor appears to be iron restricted erythropoiesis resulting from anemia of inflammation, this finding was in agreement with the finding obtained by Jacobs and his colleagues in United Kingdom (Jacobs et al., 1976). In conclusion, the majority of anemias in breast cancer are multifactorial, including chronic inflammation, chemotherapy, and malnutrition.

#### **CONCLUSION**

There is high frequency of cancer related anaemia in breast cancer (44.9%). The type of anaemia was microcytic hypochromic picture that consist with anemia of chronic disorders. Most of anemic patients were in advanced stages. The majority of anemic patients were receiving chemotherapy.

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