

To Determine the Frequency of B12 Deficiency in Patients with Pancytopenia in Karachi

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Abstract

Study Technique: A total of 81 adult patients with pancytopenia included in our study. Serum B12 levels was assessed in those patients. Spss 17 used for entry of the patients data.

Results: The mean age was 40.07 ± 12.12 years. There were total 81 patients in which 43 male and 38 were female cases. The average hemoglobin was 8mg/dl in patients.

Frequency of B12 deficiency in patients with pancytopenia was observed in 53.09% of the patients.

Conclusion: It is concluded that most common cause of pancytopenia is B12 deficiency. We have excluded other causes like folate deficiency and iron profile were also excluded from the study Patients should be properly investigated for pancytopenia and that the most cause because many of them are (remove) curable while others are manageable.

Keywords: Pancytopenia, Vitamin B12 deficiency, Anemia, Thrombocytopenia, Leucopenia

Introduction

Pancytopenia means a disorder in which all three blood cell line. i.e. RBCs, WBCs and platelets all are decreased in blood [1]. The marrow may be normo-cellular or even hyper cellular without any abnormal cells in cases of ineffective hematopoiesis, dysplasia or peripheral destruction [2,3]. Regardless of the etiology it is common in our clinical setting [4], with vitamin B12 deficiency being the leading cause [5]. One of the manifestations of B12 deficiency is pancytopenia. It has been reported that B12 deficiency accounts for 16%-61% cases of pancytopenia [4,5]. The rationale of this study is to estimate the actual magnitude of vitamin B12 deficiency as different studies have shown different outcome ranges from 16% to 61% [4,5-7] is a common problem in clinical and haematological practice. It may be due to reduced production of blood cells as a result of bone marrow suppression or infiltration, and in peripheral destruction or splenic pooling of mature cells [8,9]. Its common clinical manifestations include fatigue, lethargy pale color skin, infections or bleeding problems [10-12].

The aetiology of megaloblastic anaemia is diverse but a common basis is impaired DNA synthesis. The most common causes of megaloblastosis are vitamin B12 and folate deficiencies. Cobalamin metabolism and folate metabolism are intricately related, and abnormalities in these pathways are believed to lead to the attenuated production of DNA. The bone marrow is hypercellular and there is accumulation of megaloblast due to selective death of more mature forms leading to pancytopenia [13-17].

Objective

The objective of the study is to determine the frequency of B12 deficiency in patients with pancytopenia.

Operational definition

To determine the frequency of B12 deficiency in patients with Pancytopenia in Karachi.

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Material and Methods

Setting

Department of Medicine, Ziauddin University Hospital, Karachi.

Duration

Six months

Sample Size

Previous study concluded prevalence of B12 Deficiency as 16% (3,4) (p=0.16), d=8% with 95% confidence interval and margin of error 10% for our study, the sample size is 81.

$$n = Z^2 \times P \times (1-P)/d^2$$

Where n = sample size of the study.

Z = is the score and is taken as 1.96 for 95% confidence level.

P = is prevalence of the disease expressed as decimal.

Study Design

Descriptive cross – sectional study.

Sampling Technique

Non-probability, consecutive sampling.

Sample Selection

Inclusion criteria:

- Clinically and biochemically diagnosed Pancytopenia cases on current admission.
- Patients between 18-65 years of both genders.
- Patients who will provide informed consent.

Exclusion criteria:

- Patients with any type of malignancy or metastatic disease.
- Patients with established diagnosis of any neuropathy.
- Patients taking multi-vitamins.
- Patients with chronic liver disease due to hepatitis b and hepatitis c
- Patients with immunodeficiency.
- Pregnancy.
- Serum folate deficiency or drug induced pancytopenia.

Data Collection Procedure

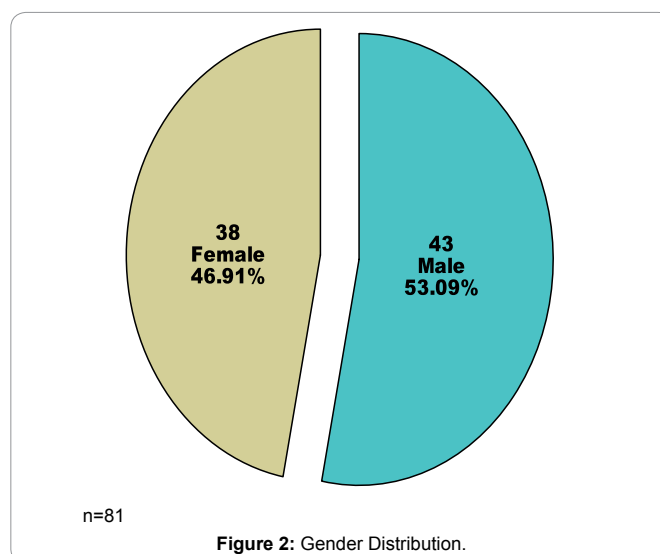
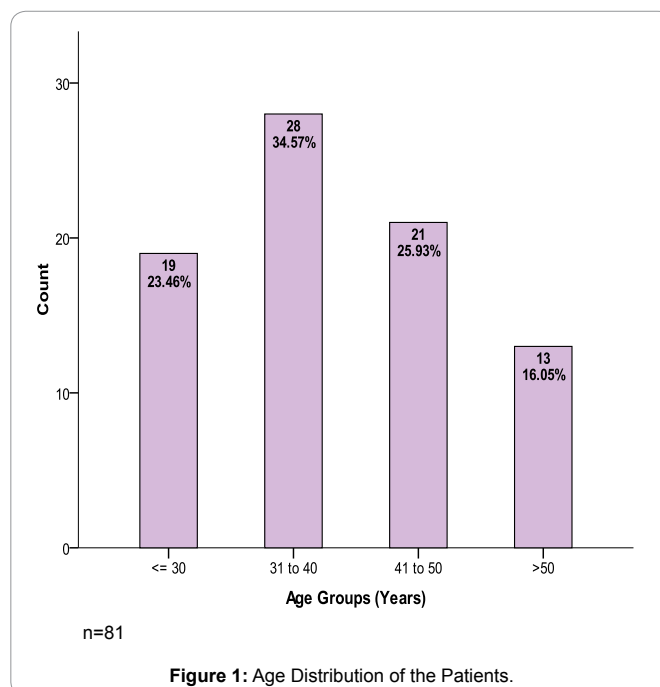
Data were collected from patients admitted in the medical ward on the basis of inclusion and exclusion criteria. The purpose and procedure, risk and benefits of the study was explained to the patients and informed consents was taken. Serum B12 levels was assessed by taking 3 to 4 cc of blood from selected patients. Vitamin B12, Serum Folate, CBC, Iron Profile were performed from authentic laboratory of Karachi in order to avoid any discrepancy in the test results. Data from selected patients were collected on a proforma see attachment A.

Data Analysis Procedure

Data analysis was performed through SPSS version 19. Mean and standard deviation was calculated for the quantitative variable. Frequencies and percentages were calculated for the gender, economic status, educational status and low B-12 levels. Stratification was done to see the outcome with respected age, gender, economic and educational status. Chi square test was applied. P value of less than and equal to 0.05 was taken as significant (Figures 1-4).

Results

Frequency of B12 deficiency in patients with pancytopenia was observed in 53.09% patients as presented in Figure 5. Rate of B12 deficiency was not significant among different age groups



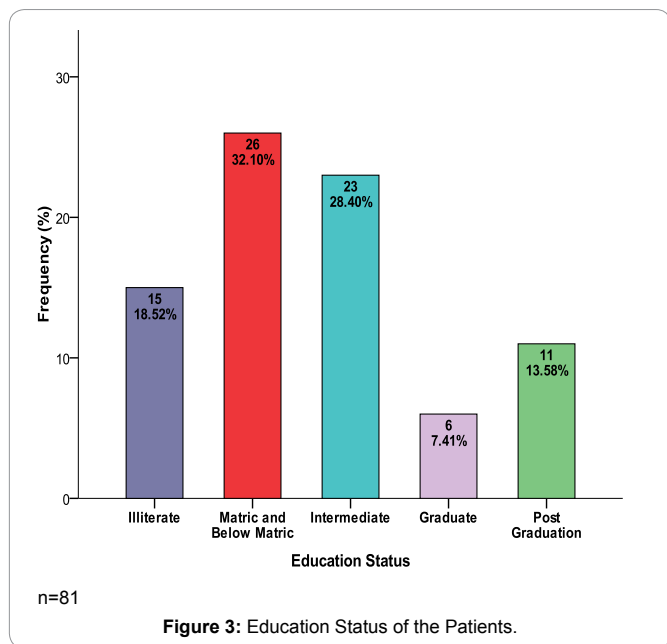


Figure 3: Education Status of the Patients.

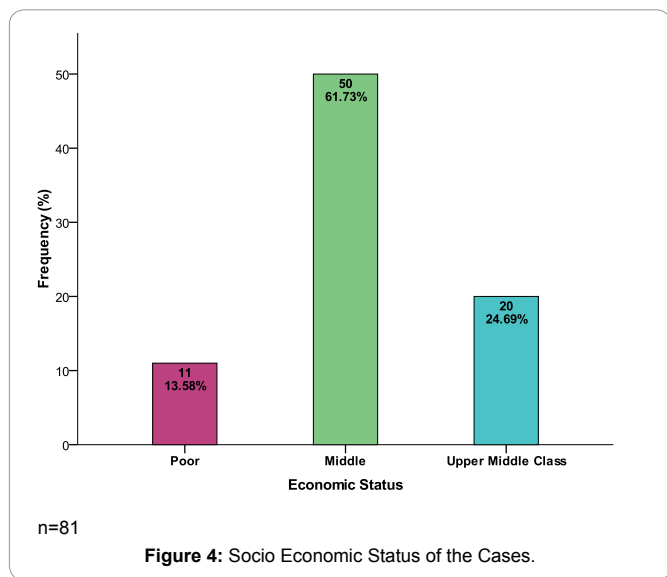


Figure 4: Socio Economic Status of the Cases.

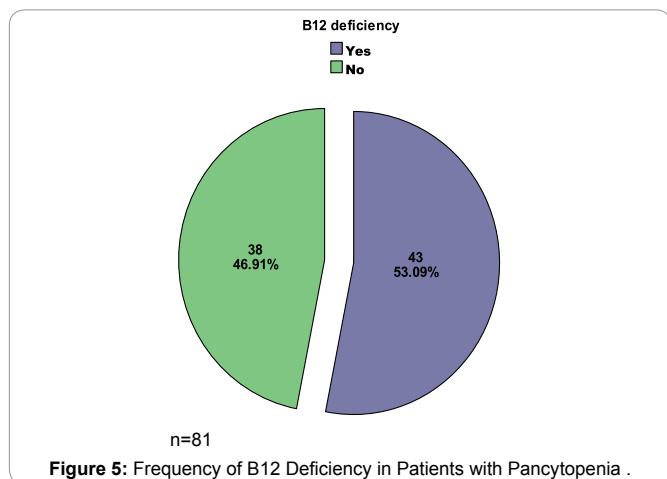


Figure 5: Frequency of B12 Deficiency in Patients with Pancytopenia .

Descriptive Statistics		Age (Years)
Mean		40.07
95% Confidence Interval for Mean	Lower Bound	37.33
	Upper Bound	42.82
Median		39
Std. Deviation		12.42
Minimum		18
Maximum		65
Interquartile Range		17

n=81

Table 1: Descriptive Statistics of Age of the Patients.

Age Groups (Years)	B12 DEFICIENCY		Total	P-Value
	Yes n=43	No n=38		
≤ 30 Years	12(63.2%)	7(36.8%)	19	0.31
31 to 40 Years	11(39.3%)	17(60.7%)	28	
41 to 50 Years	13(61.9%)	8(38.1%)	21	
>50 Years	7(53.8%)	6(46.2%)	13	

Chi-Square=3.57

Table 2: Frequency of B12 Deficiency in Patients with Pancytopenia for Different Age Groups.

as shown in Tables 1 and 2. With respect to gender, rate of B12 deficiency in patients with pancytopenia was also insignificant between male and female ($p=0.207$) as given in Table 2.

The mean age of the patients was 40.07 ± 12.12 years (95%CI: 37.33 to 42.82). Out of 81 cases, 43(53.09%) were male and 38(46.91%) were female cases. Male to female ratio was 1.1:1 [18] study there were 36 (58%) males and 26 (42%) females with 1.38:1 male to female ratio and a mean age 37.76 years \pm 16.38 SD.

Discussion

In the present study frequency of B12 deficiency in patients with pancytopenia was observed in 53.09% patients as presented in Figure 5. It has been reported that B12 deficiency accounts for 16%-61% cases of Pancytopenia [4,4-7].

Most of the patients gave the history of poor eating habits i.e. food taboos, poor quality of food and self-avoidance of necessary foods. The high prevalence of nutritional anemias in India has been cited for the increased frequency of megaloblastic anemia. Because of geographical and social similarities, nutritional anemias may also be responsible for increased frequency of megaloblastic anemia in northern region of Pakistan. Among the nutritional anemia's, vitamin B12 deficiency is more prevalent than folate deficiency in Pakistan [19].

In a study conducted in Malaysia, pancytopenia was found in 64% patients with megaloblastic anemia [20]. In Western countries, pancytopenia has become less common in patients with megaloblastic anemia, as only 13.7% of cases were reported in a study done in New York [21].

There is increased worldwide concern about the consequences of folic acid and vitamin B12 deficiencies on health, which include megaloblastic anemia. Dietary deficiency of vitamin B12 due to vegetarianism is increasing and it also causes hyperhomocysteinemia. Thus vitamin B12 deficiency, though having vague or highly variable presentation, yet can lead to many

complications in the human body which can prove fatal if not diagnosed in time or left untreated. As much physicians should have a high index of suspicion for Vitamin B12 deficiency when dealing with patients presenting with symptoms of anemia such as pallor and weakness and/or diagnosed with pancytopenia on further workup [22-27].

Conclusion

Patients should be properly investigated for pancytopenia and its causes because many of them are completely curable while others are manageable.

The ratio of male female was also the same the ratio were 1:1. Other significant factors were seen was more in low socioeconomic status and age 40.07 ± 12.12 years.

Limitations

Sample size is short and bone marrow biopsy should be done as diagnostic test.

In Pakistan probably poverty, poor eating habits, poor quality of foods, and self-avoidance of necessary foods may be the causes of nutritional deficiencies leading to B12 deficiency.

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