ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
National Library of Medicine - ID: 101731606

International Journal of Medical Science and Innovative Research (IJMSIR)
IJMSIR : A Medical Publication Hub
Available Online at: www.ijmsir.com
Volume – 9, Issue – 2, March – 2024 , Page No. : 60 – 68

A Study of Clinical Profile and Etiological Spectrum of Patients with Pancytopenia in JSS Hospital

[1]Dr. Swathi B.S, Assistant Professor, Department of General Medicine, JSSAHER, Mysore, Karnataka

[2]Dr. Nimrah Fathima, Assistant Professor, Department of General Medicine, JSSAHER, Mysore, Karnataka

[3]Dr. Bernice Roberts, Senior Resident, Department of General Medicine, JSSAHER, Mysore, Karnataka

[4]Dr. Madhurya M, Senior Resident, Department of General Medicine, JSSAHER, Mysore, Karnataka

Corresponding Author: Dr. Swathi B.S, Assistant Professor, Department of General Medicine, JSSAHER, Mysore, Karnataka

Citation this Article: Dr. Swathi B.S, Dr. Nimrah Fathima, Dr. Bernice Roberts, Dr. Madhurya M, "A Study of Clinical Profile and Etiological Spectrum of Patients with Pancytopenia in JSS Hospital", IJMSIR - March - 2024, Vol – 9, Issue - 2, P. No. 60 – 68.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background and objectives: Pancytopenia is one of the common hematological presentations come across in clinical practice. Patients of pancytopenia can have a varied spectrum of clinical manifestations, ranging from an unsuspecting weakness and pallor to life threatening sepsis or bleeding manifestations. Similarly, the etiology behind the depletion of all the three cell lines could vary from a seemingly benign nutritional deficiency to a devastating diagnosis of a hematological malignancy. The objective of this study is to assess this varied clinical profile and etiological spectrum of pancytopenia patients in JSS hospital, Mysuru, which could help in the better evaluation and pave an easy line of approach for the management of patients of pancytopenia

Method: A total of 80 patients with pancytopenia who satisfied the inclusion and exclusion criteria were included in the study. Detailed history and examination was done. Baseline investigations and other relevant investigations to find the cause of pancytopenia were done. The results were analysed statistically.

Results: In our study, the incidence of pancytopenia showed a male preponderance, with maximum number of cases in the age group of 40-60 years. The most common presenting symptom was generalised weakness followed by loss of appetite, while the most common presenting clinical sign was pallor followed by splenomegaly. The most common cause for pancytopenia was megaloblastic anemia followed by dimorphic and microcytic anemia.

Conclusion: Cases of pancytopenia should always be evaluated in detail to look for the underlying cause. The diverse clinical spectrum with which pancytopenia presents should be kept in mind and clinical features like weakness, pallor, hepatosplenomegaly should always be evaluated with a complete blood count, peripheral blood smear and if needed bone marrow studies to arrive at the root cause of pancytopenia. Megaloblastic anemia has been established as one of the most common causes and should never be missed by physicians especially because it can be treated most easily.

Keywords: Pancytopenia, Megaloblastic anemia, dimorphic anemia

Introduction

Pancytopenia is defined as a simultaneous reduction in all three hematopoietic cell lines i.e., erythrocytes, leukocytes and platelets. Pancytopenia is one of the manifestations of an underlying disease which needs to be investigated for the efficient treatment and restoration of the cell lines. Hence it is not a disease primarily, but a presentation of an underlying hematological dysfunction.[1]

Pancytopenia is one of the important differential diagnoses to be suspected in a patient who presents with unexplained, prolonged fever, pallor, fatigue and easy tendency to bleed.[2] The etiology of pancytopenia varies in different populations, ranging from non malignant diseases such as drug induced, infections or nutritional deficiencies, to malignancies.[1][3]

Detailed history, clinical findings on thorough examination, complete blood count and a peripheral blood smear are sufficient to give valuable information in the work up of most of these patients. Based on these findings, bone marrow studies can be planned, which usually are diagnostic for cytopenias that evade a straight forward diagnosis. [4]

As the clinical picture and the etiological factors of pancytopenia occupy an expansive stretch of medicine, it is important to not miss out on the diagnosis due to multiple overlapping factors; more so when the etiology is an easily treatable one, like a nutritional deficiency. Hence, the present study was conducted to assess the clinical profile and etiological pattern of pancytopenia patients, that could help in a structured care plan towards these patients.[1][3][5]

Methods

This was a cross sectional study conducted in the department of General Medicine, JSS Hospital, Mysuru over a period of 6 months. Approval of local ethical committee was taken before conducting the study. A total of 80 patients who fulfilled the criteria for pancytopenia, satisfying the inclusion and exclusion criteria were included in the study.

Inclusion criteria

- Age > 18 yrs
- Hb < 13 g/dl in men and < 12 g/dl in women
- TLC < 4000 / cu mm
- Platelets < 150000/microL

Exclusion criteria

- Age < 18 yrs
- Patients on chemotherapy for malignancies
- Infective causes of pancytopenia

A complete history, including presenting complaints, diet history- mixed or pure vegetarian diet and drug history was taken. General physical examination with specific emphasis on pallor, icterus, petechiae, skin changes, clubbing, lymphadenopathy and hepatosplenomegaly was carried out. Complete blood count with peripheral blood smear was done in all patients. If the above investigations showed findings that were suggestive of cobalamin deficiency such as macro-ovalocytes, hypersegmented neutrophils, anisopoikilocytosis, elevated mean corpuscular volume (MCV), then serum Vitamin B12 and folic acid levels were estimated. If it was found to be in the normal range, other causes of pancytopenia were looked for. Bone marrow aspiration/biopsy and iron profile was done whenever indicated. Renal function test, liver function test, chest X-Ray, ultrasound abdomen and pelvis was done as and when required.

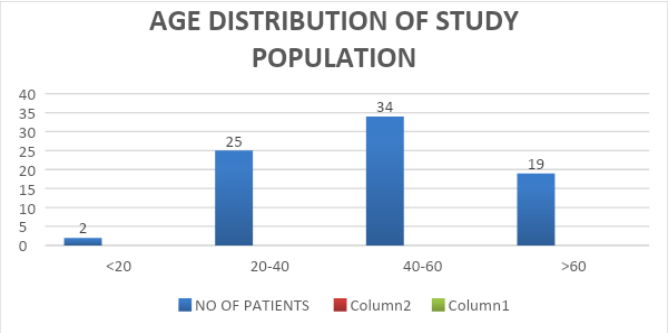
All the findings were compiled on Microsoft Excel and statistically analysed. Categorical variables were estimated in numbers and percentages.

Results

The average age in our study was found to be 46.63 years, with maximum number of patients in the 40-60

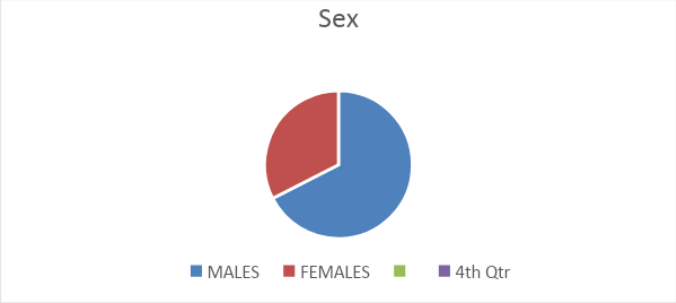
year age group

Age In Years	No. of Patients	Percentage
<20	2	2.5
20-40	25	31.25
40-60	34	42.5
>60	19	23.75



Sex distribution - Male preponderance was seen

Males	54	67.5
Females	26	32.5

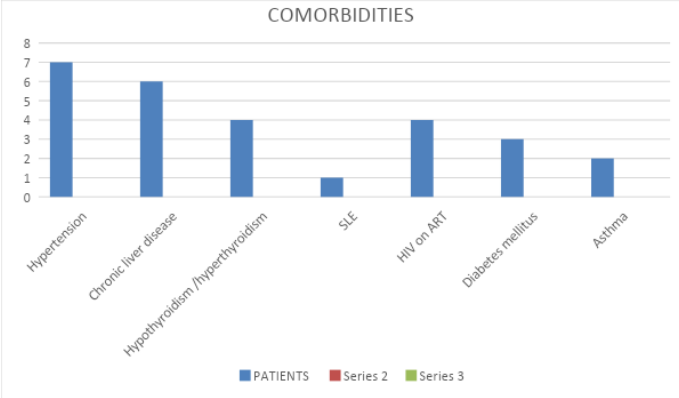


Symptom distribution

Symptom	Number	Percentage
Generalized weakness	59	80
Loss of appetite	29	36.25
Jaundice	19	23.75
Exertional dyspnea	16	20
Fever	12	15
Upper/lower gastrointestinal Bleed/Petechial rash/mucosal bleed	11	13.75
Weight loss	8	10
Giddiness	7	8.75
Cough	7	8.75
Loose stools	6	7.5
Pain abdomen	4	5
Low back ache	2	2.5
Joint pains	1	0.125

Comorbidities

Comorbidities	No. of patients	Percentage
Hypertension	7	8.75
Chronic liver disease	6	7.5
Hypothyroidism /hyperthyroidism	4	5
SLE	1	0.125
HIV on ART	4	5
Diabetes mellitus	3	3.75
Asthma	2	2.5

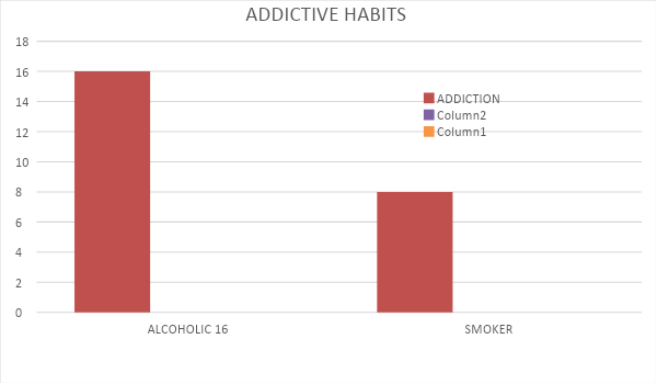


Dietary habits

Diet	No. of patients	Percentage
Vegetarian	32	40
Mixed diet	48	60

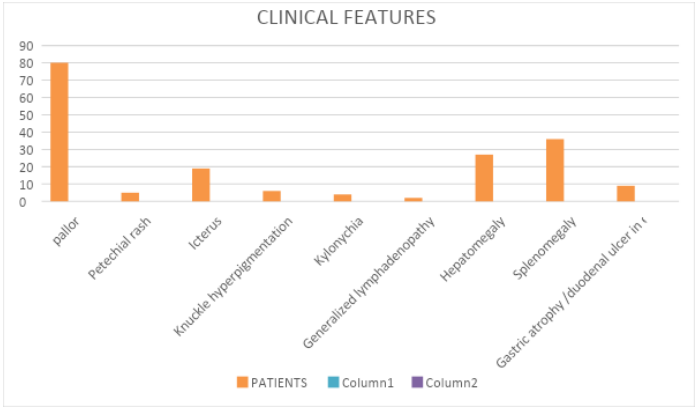
Addictive habits

Addictive habits	No. of patients	Percentage
Alcoholics	16	20
Smokers	8	10



Clinical features

Clinical feature	No. of patients	Percentage
Pallor	80	100%
Petechial rash	5	6.25
Icterus	19	23.75
Knuckle hyperpigmentation	6	7.5
Koilonychia	4	5
Generalized lymphadenopathy	2	2.5
Hepatomegaly	27	33.75
Splenomegaly	36	45
Gastric atrophy /duodenal ulcer in endoscopy	9	11.25



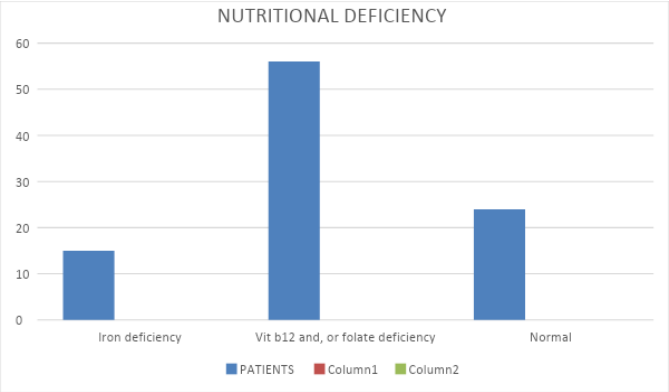
Etiology of pancytopenia

Etiology	No. of patients	Percentage
Megaloblastic anemia	47	58.75
Cause could not be established	7	8.75
Microcytic anemia due to iron deficiency	7	8.75
Dimorphic anemia secondary to both B12/folate or iron deficiency	7	8.75
Myelodysplastic syndrome	3	3.75
Autoimmune cause	2	2.5
Lymphoma/leukemia	2	2.5
Multiple myeloma	1	0.125
Drug induced	2(Azathioprine and ART)	0.125
Hemophagocytic Lymphohistiocytosis	1	0.125
Hypersplenism	1	0.125
Bone marrow granuloma	1	0.125

Distribution of nutritional deficiency

	No. of patients	Percentage
Iron deficiency	15	18.75
Vit B12 and folate	42	52.5

deficiency		
Normal	24	30
Isolated B12 /folate deficiency	14	17.5
Combined iron and b12 /folate deficiency	10	12.5



Age wise distribution of Vit B12 / folate deficiency

Age	<40 years	>40 years
Patients	26	21

Observation

In our study, out of 80 patients, 54 (67.5%) patients were males, and 26 (32.5%) patients were females.

Majority of the patients were between the age group of 40-60 years, numbering 34 patients (42.5%). There were 25 (31.25%) patients in the age group 20-40 years and 19 (23.75%) were above 60 years. Least number of patients were in the age group less than 20 years, numbering 2 patients (2.5%).

Out of 80 patients, 32 (53.5%) patients were vegetarians and 48 patients (60%) were consuming a mixed diet.

The most common symptom in our study was generalized weakness with 59 (80%) patients complaining of it, followed by loss of appetite by 29 (36.25%) patients. Other common clinical features were jaundice- 19 (23.75%), exertional dyspnea-16 (20%), fever- 12 (15%), bleeding from different sites- 11(13.75%), weight loss- 8 (10%), giddiness- 7 (8.75%), cough -7 (8.75%) , loose stools- 6 (7.5%) ,pain abdomen- 4 (5%),low backache- 2 (2.25%) and joint pain-1 (0.125%).

The most common clinical finding in our study was pallor (100%), followed by splenomegaly (45%) and hepatomegaly (33.75%). Icterus (23.75%), knuckle hyperpigmentation (7.5%), gastric atrophy /duodenal ulcer in endoscopy (11.25%), koilonychia (5%) and generalized lymphadenopathy (2.5%), were also found.

The most common cause of pancytopenia in our study was megaloblastic anaemia. There were a total of 47 patients of megaloblastic anaemia which constituted 58.75% of the total patients. The next common causes of pancytopenia were dimorphic and microcytic anaemia. There were 7 (8.75%) patients of dimorphic anaemia which was due to both folic acid/vit B12 and iron deficiency and 7 (8.75%) patients of microcytic anaemia due to severe iron deficiency. Other causes of pancytopenia in our study were myelodysplastic syndrome in 3 (3.75%) patients, autoimmune causes in 2 (2.5%) patients , lymphoma/leukemia in 2 (2.5%) patients, secondary to azathioprine intake in 1(0.125%)patient, multiple myeloma in 1 (0.125%)patient, hemophagocytic lymphohistiocytosis in 1(0.125%)patient, hypersplenism in 1(0.125%) patient and bone marrow granuloma in 1 (0.125%) patient. In the remaining 7 (8.75%) patients the cause could not be established.

56 of the 80 patients in our study had low vitamin B12 or folic acid levels, out of which 46 had low vitamin B12 levels. 15 (18.29%) patients were found to have iron deficiency.

In this study many patients were also found to have comorbidities. The most common comorbidity found was hypertension in 7 (8.75%) patients and second most

common comorbidity was chronic liver disease in 6 (7.5%) patients. Thyroid disorders in 4 (5%) patients, HIV positive patients on ART in 4 (5%), diabetes mellitus in 3 (3.75%) patients, asthma in 2 (2.5%) patients and SLE in 1(0.125%) patient.

In this study 16 (20%) patients were chronic alcoholics and 8 (10%) patients were smokers.

Discussion

Pancytopenia is an important entity encountered in our day to day clinical practice. The present study was conducted to analyse the clinical profile and etiological spectrum of patients with pancytopenia. A total of 80 cases of pancytopenia were studied in detail.

Age-wise and gender-wise incidence, presenting complaints, clinical findings, dietary habits and the causes of pancytopenia were studied in all cases and the observations were compared with those of studies published in the literature. The infectious causes of pancytopenia were excluded in our study.

The age distribution of patients in our study ranged from 18 to 75 years, the most common age group of presentation being 41–60 years which was similar to the observations in studies done by Dasgupta et al.[6] and Tariq et al. [7]In other studies, 12–30 and 21–40 years age groups were the most common age groups for presentation of pancytopenia. [8][9].

The male to female ratio in the present study was 2:1 with a male preponderance, which was similar to studies done by Rehmani TH et al. [10] and Khan SP et al. [11]

The most common presenting symptom of pancytopenia was found to be generalized weakness which is in concordance with other similar studies [1,2,5,12,13].The next common symptom was loss of appetite which has not been very commonly witnessed in other studies. However in studies done by Gudina EK et al [14] and Jain A et al[1]lesser number of patients had loss of appetite compared to our study. Jaundice was also found in a higher number of pancytopenia patients in our study compared to other studies. Whereas in the studies conducted by Jain A et al[1], Mandli L[2] Gayathri et al [12], fever and dyspnoea were common symptoms next only to generalized weakness.

Other presenting symptoms in this study were fever, abdominal pain, bleeding manifestations, weight loss, giddiness, loose stools, cough, joint pain and low back ache.

Among the clinical signs, pallor was seen in all the patients. 45% patients exhibited splenomegaly, 33.75% exhibited hepatomegaly. This was consistent with studies conducted by Gajbhiye et al[5] and Khodke et al[8] in an Indian population with pancytopenia, where pallor was observed in all patients, followed by splenomegaly and hepatomegaly.

Icterus was present in 23.75% of patients, which is similar to findings in the study conducted by Rathwa et al[13]. Other signs detected were knuckle hyperpigmentation, petechiae and koilonychia. We also found gastric erosions and duodenal ulcers on upper GI endoscopy in a few patients.

In this study, 40% of patients were vegetarians and 60% had a mixed diet. Premkumar et al. also reported similar results [15]; however, most of the previous studies have not considered dietary habits.

Also, we found 20% to be chronic alcoholics and 10% chronic smokers. Alcoholism can contribute to nutritional deficiencies like folic acid and vit B12.

Combined vit B12 and folate deficiency was found in 12.5% of patients. Iron deficiency was found in 18.75% of patients.

In this study, megaloblastic anaemia was found to be the most common cause of pancytopenia accounting for 58.75%% of all cases, in agreement with recently

conducted similar studies [1,2,4,5,12,13,16]. The prevalence of Megaloblastic anaemia in various other studies done on pancytopenia varies from 13.2% to 74% [1,7-10,12,17-23]. The reason behind high prevalence of megaloblastic anemia consistently in most of the studies correlates with a high prevalence of vitamin B12 and folate deficiencies due to dietary factors, geographical and socioeconomic reasons [1,8]. As these nutrients play an integral part in the synthesis of DNA, patients start producing disordered hematopoietic cells, which eventually leads to pancytopenia. [1,24].

The next commonly detected aetiologies in this study were dimorphic anaemia (7.5%) and microcytic anaemia due to iron deficiency (7.5%). Jain et al(1) and Khan et al(11) reported prevalence of dimorphic anemia at 26% and 21% respectively.

The nutritional deficiencies can be attributable to chronic alcoholism, iron deficiency secondary to gastric erosions/duodenal ulcers and dietary habits.

We found 3.75% (3) cases of pancytopenia due to aplastic anemia ,which is comparable to a study done by Tejeswini et al(16), however in most of the other studies aplastic anaemia accounts for a higher percentage of cases(1-5).

Other causes in our study were myelodysplastic syndrome in 3 (3.75%) patients. Similar prevalence was reported in studies done by Tariq et al(7) and 1 case (3%) in a study by Akshatha, et al(25).

SLE was found in 2.5% of patients which is similar to a study done by Santra G et al(3). Malignancies like lymphomas and leukaemias were found in 2.5% of patients and multiple myeloma in 1 patient. 2 of our cases had pancytopenia due to ART and azathioprine.

We found HLH as a cause of pancytopenia in 1 patient, hypersplenism in 1 patient and bone marrow granuloma in 1 patient.

In 7 cases (8.75%)the cause could not be established.

Conclusion

Pancytopenia being a hematological manifestation of an underlying disorder has to always be evaluated in detail to look for the cause. With a varied spectrum of clinical features that it presents with, a physician should always have a keen eye on clinical features that may mimic other common disorders like weakness, fever, hepatosplenomegaly. A simple evaluation of complete blood count and a peripheral blood smear in suspected cases, may clinch the diagnosis, while a bone marrow evaluation may be needed in some cases that may masquerade the cause. Easily treatable megaloblastic anemia being the most common etiology behind pancytopenia, should never be missed and should be identified and treated promptly.

References

1. Jain A, Garg R, Kaur R, Nibhoria S, Chawla SPS, Kaur S. Clinico-hematological profile of pancytopenic adult patients in a tertiary care teaching hospital. Tzu Chi Med J. 2021 Aug 23;34(1):95-101. doi: 10.4103/tcmj.tcmj_17_21. PMID: 35233363; PMCID: PMC8830552.
2. Mandli L. Clinical Profile and etiological causes of pancyopenia : a study in a tertiary care hospital. Int J Adv Med. 2019 Oct; 6(5) : 1379-1382; DOI : http://dx.doi.org/10.18203/2349-3933.ijam20194211
3. Santra G, Das BK. A cross-sectional study of the clinical profile and aetiological spectrum of pancytopenia in a tertiary care centre. Singapore Med J. 2010 Oct;51(10):806-12. PMID: 21103817.
4. Dhooria HPS, Kaur S, DhooriaGSetal.Etiological Spectrum and clinical profile of patients admitted with Pancytopenia. JAMMR 2020; 32(4):56- 65.
5. Gajbhiye SS, Karwa AR, Dhok A, Jadhav SS. Clinical and Etiological Profiles of Patients With

Pancytopenia in a Tertiary Care Hospital. Cureus. 2022 Oct 18;14(10):e30449. doi: 10.7759/cureus.30449. PMID: 36407228; PMCID: PMC9672535.

6. Dasgupta S, Mandal PK, Chakrabarti S. Etiology of Pancytopenia: An Observation from a Referral Medical Institution of Eastern Region of India. J Lab Physicians. 2015 Jul-Dec;7(2):90-5. doi: 10.4103/0974-2727.163136. PMID: 26417158; PMCID: PMC4559635.
7. Aziz T, Ali L, Ansari T, Liaquat HB, Shah S, Ara J. Pancytopenia: megaloblastic anemia is still the commonest cause. Pak J Med Sci. 2010;26:132–136.
8. Khodke K, Marwah S, Buxi G, Yadav RB, Chaturvedi NK. Bone marrow examination in cases of pancytopenia. J Indian Acad Clin Med. 2001;2:55–9.
9. Devi PM, Laishram RS, Sharma PS, Singh AM, Singh MK, Singh YM. Clinico-hematological profile of pancytopenia in Manipur, India. Kuwait Med J. 2008;40:221–224.
10. Spectrum of pancytopenia; a tertiary care experience. Rehmani TH, Arif M, Haider S, Atif S, Ahmad R, Saeed M. Prof Med J. 2016;23:620–626.
11. Khan SP, Geelani S, Khan FP, Ali N, Akhter S, Shah S, et al. Evaluation of pancytopenia on bone marrow aspiration – Study at a tertiary care center in Kashmir valley, India. Int J Adv Med. 2018;5:946–9
12. Gayathri BN, Rao KS. Pancytopenia: a clinicohematological study. J Lab Physicians. 2011 Jan;3(1):15-20. doi: 10.4103/0974-2727.78555. PMID: 21701657; PMCID: PMC3118050.
13. Rathwa, Sanjaykumar, et al. "A single-center cross-sectional study on the clinical profile of pancytopenia and a novel scoring system for megaloblastic anemia." Apollo Medicine, vol. 19, no. 3, July-Sept. 2022, p. 157.
14. Esayas Kebede Gudina, Hiwot Amare, Kasahun Benti, Shoba Ibrahim, Gashahun Mekonnen. Pancytopenia of Unknown Cause in Adult patients Admitted to a Tertiary Hospital in Ethiopia: Case series. Ethiop J Health Sci.2017; 28(4): 375. doi:http://dx.doi.org/10.4314/ejhs.v28i4.3
15. Premkumar M, Gupta N, Singh T, Velpandian T. Cobalamin and folic Acid status in relation to the etiopathogenesis of pancytopenia in adults at a tertiary care centre in north India. Anemia. 2012;2012:707402.
16. Tejeswini V et al., Clinicohematological profile of Pancytopenia- A South Indian tertiary hospital experience, Indian Journal of Pathology and Oncology, July- September 2015; 2(3); 165-169; https://www.ijpo.co.in/article-details/791
17. Kulkarni NS, Patil AS, Karchi SD. Study of pancytopenia in a tertiary care hospital in North Karnataka. Int J Med Res Health Sci 2017;6:61-7.
18. Das Makheja K, Kumar Maheshwari B, Arain S, Kumar S, Kumari S, Vikash. The common causes leading to pancytopenia in patients presenting to tertiary care hospital. Pak J Med Sci. 2013 Sep;29(5):1108-11. doi: 10.12669/pjms.295.3458. PMID: 24353701; PMCID: PMC3858928.
19. Frequency of different causes of pancytopenia in a tertiary care hospital. Shafiq M, Ayyub M, Noor A. Pak Armed Forces Med J. 2014;64:559–563.
20. Khunger JM, Arulselvi S, Sharma U, Ranga S, Talib VH. Pancytopenia a clinicohaematological study of 200 cases. Indian J PatholMicrobiol. 2002;45:375–379.
21. Pancytopenia--a clinico-hematologic analysis of 77 cases. Tilak V, Jain R. https:// pubmed. ncbi.

nlm.nih.gov/11127368/Indian J PatholMicrobiol. 1999;42:399–404

22. Jha A, Sayami G, Adhikari RC, Panta AD, Jha R. Bone marrow examination in cases of pancytopenia. J Nepal Med Ass
23. Kumar R, Kalra SP, Kumar H, Anand AC, Madan H. Pancytopenia a six year study. J Assoc Physicians India. 2001;49:1078–1081 oc. 2008;47:12–17.
24. Trivette ET, Hoedebecke K, Berry-Cabán CS, Jacobs BR. Megaloblastic hematopoiesis in a 20 year old pregnant female. Am J Case Rep. 2013;14:10–2.
25. Sch. J. App. Med. Sci., 2015; 3(5B):1926-1928 Pancytopenia- a clinical and etiological study Dr Akshatha Savith1 , Dr Rama Mishra R DOI: 10.36347/sjams.2015.v03i05.026