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Prevalence of megaloblastic anemia in people of Gwalior Chambal region

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Abstract
Background: Megaloblastic anemia (MA) is common type of anemia in Indian population during recent years. Unrecognized or misdiagnosed MA can lead to significant morbidity. Data is insufficient regarding its prevalence in our area.
Aims and Objective: To study the prevalence of MA in general population of study place.
Materials and Methods: An observational study including 4890 subjects having clinical features suggestive of anemia at Department of Pathology, GR Medical College and JA group of Hospitals, Gwalior. The study was carried out during the period from May 2016 to April 2017. All the patients were evaluated for complete blood count along with RBC indices and PBS (peripheral blood smear) examination was done.
Results: Mean age of study cohort was 27.55±9.77 years with female preponderance (55.02%). Prevalence of MA in present study was 12.35%.
Conclusion: Prevalence of MA is high especially in young population in study cohort. Supplementation through implemented nutritional education programmes and education regarding diet patterns may overcome this deficiency.

Keywords:megaloblastic anemia, morbidity, anemia, RBC indices

Introduction
Recent report showed that 56 per cent of the population in India is anemic. Anemia has severe consequences affecting people's growth, cognitive development and work productivity. Incidence of megaloblastic anemia (MA) has increased drastically over the last two to three decades in India as reported by several studies [1, 2].
In Indian population megaloblastic anemia (MA) is reported to be one of the frequently occurring disease. Vitamin B12 and folate deficiency is the root cause for MA but several reports has shown that it may also results in defective DNA synthesis due to lack of vitamin B12 and folic acid [3,4]. MA, if unrecognized or misdiagnosed can leads to significant morbidity.
Limited literature is available to study the prevalence of MA in general population of our area. Hence, present study was designed to find out the prevalence of MA.

Materials and Methods
The present study was done including 4890 subjects who were enrolled consecutively in the Department of Pathology, GR Medical College & JA group of Hospitals Gwalior from May 2016 to April 2017.
Megaloblastic anemia was defined as the MCV is over 110fL. Other findings in the blood count were decreased hemoglobin and RBC count, decreased numbers of WBC and platelets [5].
All subjects having clinical features of anemia and whose blood sample were sent for pathological analysis were included. A pre-approved proforma was used to document demographic data such as age and gender. Two blood samples were collected from each patient, 2 ml in EDTA for complete blood counts (CBC) and 5 ml clotted blood for serum. CBC was done on the day of blood sampling. Blood parameters including hemoglobin, PCV, MCV, MCHC and MCH were also analyzed by 5 part hematology analyzer. PBS examination and reticulocyte count was also done.
All the data were analyzed using IBM SPSS Ver. 20 software. Data is expressed as mean ± standard deviation (SD).

Results
Mean age of study cohort was 27.55±9.77 years. Most common age group was 21-30 years [2576 (52.68%)] followed by 31-40 years [866 (17.71%)]. Maximum subjects were female [2690 (55.02%)] compared to male [2200 (44.98%)].
Out of 4890 subjects, 604 (12.35%) were found to have MA. Prevalence of MA in present study is 12.35%.

Table 1: Showing mean of various blood analysis parameters

Parameters		RBC	TLC	Platelet (lacs)	PCV	MCV	Hb%	MCHC	MCH
Mean		1.595	6532.51	1.89	18.378	143.49	5.76	30.773	37.841
Median		1.400	5000.00	1.6	17.000	118.00	5.30	30.000	36.000
Std. Deviation		0.7455	4861.138	1.04	7.7638	33.31	2.30	14.962	36.308
Percentile	25	1.030	3600.00	1.5	12.250	109.20	3.900	29.000	33.000

	50	1.400	5000.00	1.6	17.000	118.00	5.300	30.000	36.000
	75	2.075	8200.00	1.9	23.500	129.75	7.300	32.000	38.950

RBC; red blood cell, TLC; total leukocyte count, PCV; packed cell volume, MCV; mean corpuscular volume, Hb; hemoglobin, MCHC; mean corpuscular hemoglobin concentration, MCH; Mean corpuscular hemoglobin

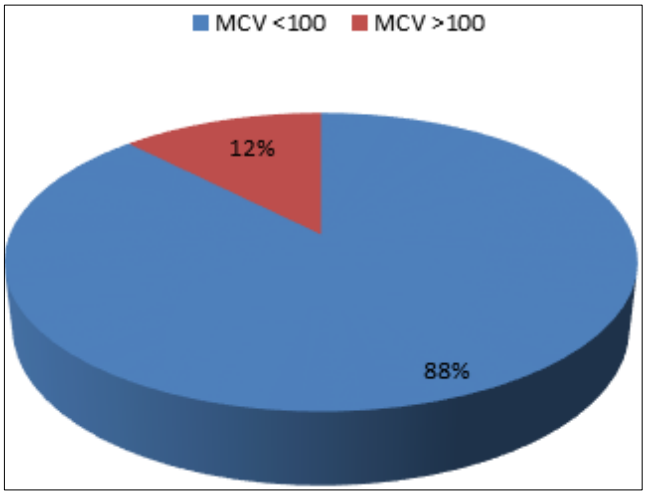

Fig 1: Showing percentage of subjects with megaloblastic anemia (MA)

Discussion

Vitamin B12 and folic acid are required for DNA synthesis. Haematopoietic cells are very sensitive to deficiency of both these vitamins. MA results from the derangement of DNA synthesis because of vitamin deficiency [6, 7]. Both folate and B12 deficiency causes megaloblastic anemia. It is commonly seen in infants with maternal B12 deficiency and adolescents [7].

Pandya *et al.* studied 50 patients with MA, out of that most of them were female and highest incidence was recorded in the age groups of 40-49 years, similar to that in present study female outnumbered male [3]. In present study most common age group affected was 21-30 years, which suggest that MA is more prevalent in young age. Similar reports were shown by an Indian study performed by Khanduri *et al.* who observed MA being more prevalent in age group between 10-30 years [8].

Reports from Caucasian and Chinese populations revealed that MA occurs in older age. In contrast, the peak incidence in present study was observed in the age group of 21-30 years (52.68%) with female preponderance [9]. It may be due to the increased demand during growth spurt, child bearing and puberty in subjects with preexisting deficiency of Vitamin 12[10].

MA has affected all age group in present study which may be due to an inadequate diet. Females were more affected in present study which in accordance to the reports of Khanduri *et al.* [8]. Similar study from Hyderabad by Nalli *et al.* also reported female majority in MA subjects [1].

Strict vegetarians are at high risk as vitamin B12 does not occur in vegetable and fruits. Gastric atrophy, malabsorption and deficiency of intrinsic factors (required for vitamin B12 absorption) are the reasons for developing MA [11].

Similar prevalence of MA was observed in American study done by Ganji *et al.* [12]. Another report of 120 anemic patients reported only 2.7% prevalence of MA. They also reported that the main causative factor was cobalamin deficiency along with pure folate deficiency [8]. Inadequate dietary intake, over-cooking of our food and perhaps, poor absorption could be contributing to high prevalence of vitamin B12 deficiency in this population [7].

MA is a chronic condition which develops over a period of time and most of the patients are well compensated. None of the report recommend for urgent blood transfusion. Before starting any form of therapy, assay for the two vitamins should be done to determine the deficiency [8]. Symptoms of MA were not recorded in present study; which is the main limitation.

Conclusion

MA anemia can results in significant morbidity in anemic patients. MA can occur at any age group but subjects with age between 21-30 years are more affected. Prevalence of MA in present study is 12.35 %. Early screening can be used for early intervention.

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