

Food Science and Technology Letters

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ISSN: 0976-982X & E-ISSN: 0976-9838, Vol. 2, Issue 1, 2011, PP-11-13

Online available at : <http://www.bioinfo.in/contents.php?id=66>

ANEMIA PROFILE IN AGRI – KOLI COMMUNITY OF COSTAL BELT

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Received: September 05, 2011; Accepted: September 28, 2011

Abstract- Anemia is a major health problem in India, affects all age- sex groups, mostly women in reproductive age group and young children, pregnant women and lactating mothers. Population residing around the coastal belt such as Agri- Koli community is vulnerable to anemia because of their unique physical, occupational, socio-economic and cultural environment. The data pertaining to anemia profile of costal population, particularly for Agri- Koli community population staying in Navi Mumbai is hardly seen in literature. The present study has been aimed to study the hemoglobin (Hb) and total iron binding capacity (TIBC) in age group of 20-50 years of male and female as markers of anemia normal healthy subjects of community residing in costal belt of Navi Mumbai to find out the incidence of anemia and its aetio-pathogenesis. Our study shows the costal communities of Navi Mumbai are more prone to anemia and it is essential to take educative steps to apprise this community about their nutritional status, encourage them to modify their diet and food habits and they should include fish as well as green vegetables, cereals, grains, dry bean etc.

Keywords- Anemia, Coastal belt, Agri – Koli community, Nutritional Status, TIBC, Hematocrit

INTRODUCTION

The Agri –Koli community is one of the original inhabitants of greater Mumbai, Navi Mumbai and one of oldest community of Maharashtra, constitutes about 12 to 15% population. One of the major causes of anemia is poor dietary intake and defective absorption due to defective gastro-intestinal homeostasis leading to parasitic infections like malaria, dengue, microfilaria and diarrhea¹. Agri- Koli community, particularly in coastal belt of Navi Mumbai is vulnerable to anemia because of their unique physical, occupational, socio-economic and cultural environment. The food intake of this community is influenced by nature and availability of sea food thus establishing a close relationship between the coastal eco system and their nutritional status posing unknown reasons of questionable nutritional status in this category of community. The data pertaining to anemia profile of costal population, particularly for Agri- Koli community population staying in India, more particularly in Navi Mumbai² is very scanty. Ferreira et. al demonstrated that 30% of total school population covered in his study were found to be anemic³ while Seshadri reported 50% prevalence of anemia in population of western India⁴. Malhotra P. studied 215 cases drawn amongst from rural population of North India and observed that 103 (47.90%) normal subject were anemic⁵. There are so far no data available on the prevalence of anemia or nutritional status of koli community of India. Hence the present study has been undertaken with the aim to study the common markers of anemia such as hemoglobin

(Hb), Mean Corpuscular Hemoglobin Concentration (MCHC), Haematocrit (PCV), Mean Corpuscular Volume (MCV) and total iron binding capacity (TIBC) in age group of 20-50 years of male and female as markers of anemia normal healthy subjects of community residing in costal belt of Navi Mumbai to find out the incidence of anemia and role of above markers of anemia in its aetio-pathogenesis, if any.

MATERIAL AND METHOD

The study has been carried out in 175 healthy participants of Agri – Koli community belongs to age group ranging between 20-50 years [female 99 (56.57%) and male 76(43.43%)]. Subjects below the age of 19 and 51 years, Pregnant women of any age group, individuals residing outside coastal villages of Navi Mumbai and subjects suffering from any diseases or on drugs therapy were excluded. Blood samples were collected for determination of hemoglobin (Hb), Mean Corpuscular hemoglobin (MCH), Haematocrit (PCV) Mean Corpuscular Hemoglobin Concentration (MCHC), and Mean Corpuscular volume (MCV), after seeking Informed consent from the participants. The information regarding age, sex, weight dietary habits, past, present illness, infections, present economical status of the participants in the study were also obtained. TIBC were measured by the Ferrozine method by colorimetric procedure using commercial kit manufactured by Crest Biosystems⁶. Hb,

PCV, RBC, MCV, MCH, MCHC, are determined by using Sysmax cell counter KX-21 (Hematology blood analyzer)⁷

OBSERVATION

The observation of our study reveals that 78 of the total 175 normal subjects were found to be with low Hb level (mean Hb conc. of 8.26 ± 1.72 gm % in females and 10.4 ± 2.12 gm % in males) demonstrating the prevalence of anemia in 48.34% subjects comprising of 27 males and 51 females. The mean Hb Conc. was observed in other 97 normal subjects was 13.61 ± 3.22 gm %. A subject was considered anemic when hemoglobin value was below 11 gm/dl for female and below 13 gm/dl for male as per the criteria described by WHO⁸. Haematocrit was considered to be abnormal at value less than 38% for female and less than 42% for male. RBC was considered normal in the range of 4200-5800 /mm³ for male and for female 3600 - 5600 /cmm⁹. Normal level for serum total iron binding capacity was considered 300-360 µg/dl¹⁰.

MCHC, hematocrit (PCV) and MCV of all the subjects were estimated and analyzed to determine the incidence of anemia in normal subjects of Koli community associated with lower Hb value. It is observed that 96 subjects out of 175 demonstrated decreased hematocrit (mean value $41.24 \pm 2.38\%$), while low MCHC was observed in 151 subjects. The female subjects demonstrated higher prevalence of low hematocrit and MCHC as compared to male subjects. The Mean Corpuscular volume (MCV) of 54 subjects demonstrated lower value (Mean Value $74.12 \mu \pm 4.82 \mu$) as compared to other 121 subjects (Mean $82.33 \mu \pm 17.54 \mu$). The lower mean value of MCV was seen in 35 female subjects while only 19 male subjects were associated with lower MCV value.

Total Iron binding capacity was measured in all the 175 subjects and it was observed that 63 subjects comprises of 49 females and 19 males demonstrated increased TIBC (mean value = 466.81 ± 85.94 µg/dl) as compared to other subjects of study who have revealed normal range of TIBC (mean value = 349.44 ± 25.12 µg/dl).

DISCUSSION

This study includes 175 healthy male and female participants of age group between 20-50 years of Agri-koli community from coastal belt villages of Navi Mumbai. All Participants were peoples, belongs to age group male and female (non pregnant). It was found that Out of 175 subjects, 76 (42.8%) subjects demonstrated anemia uniformly prevalent across all socioeconomic strata. The severity of anaemia was classified as mild (Hb > 10.5 g/dl), moderate (Hb = < 10.5 g/dl) and severe (Hb < 7.5 g/dl) depending on the haemoglobin value of anaemic subjects⁸. Mohamed El Hioui⁹ in his study on school children residing in coastal region of Morocco reported that mean haemoglobin concentration was 12.41 g/dl in boys and 12, 5 g/dl in girls. The overall prevalence of anaemia was 12, 2 % and iron deficiency was found in 20.4 %. Serum ferritin (SF), serum iron concentrations, and mean corpuscular volume (MCV) were significantly

correlated with Haemoglobin. There was an inversely significant relationship between education of the mother and anaemia in children ($p=0.01$) but not with gender, nor parents' employment. He further concluded that anaemia is relatively less prevalent in this study population and emphasised the need to explore the dietary determinants of this situation. In contrast in many developing regions of the world, the prevalence of anaemia in 5-12- years old is estimated of 46 %, with the highest rates found respectively in Africa and in South Asia at 49 % and 50 % by De Maeyer *et al*¹⁰. However Zimmermann *et al.*¹¹ suggested lower prevalence's of anaemia among rural school age children in a mountainous region from northern Morocco was 35 per cent. The findings of the present study demonstrated higher prevalence of anaemia which may be due to wider range of age group, habitat conditions of the focussed population and difference in dietary habits.

Jacobs *et al*¹² reported mean TIBC value were 63.40 ± 8.60 among a healthy Welsh population of both sexes which are lower the mean value of TIBC observed in the present study as well as in American study¹³. Dacie and Lewis¹⁴ reported TIBC range value of 45-70 µmol/L (both sexes). However, our TIBC range values in this study were higher in both sexes than the earlier reports. There are many possible explanations for the differences in the findings in this study and those of other studies. Bias in the selection of subjects could be an explanation. Cook *et al*¹⁵ for example, used a selected group in which anemia and iron deficiency were excluded. Jacobs *et al*¹² who reported lower values, used an unselected group. The time of sample collecting also affects the concentration value of TIBC. There is marked diurnal variation in the values of serum iron concentration; the values being highest in the morning, low in mid-afternoon, and lowest near midnight. Lastly, differences might reflect true differences in the iron status of various groups¹⁶. We observed high level of TIBC (36 %) in 63 subjects including male and female. The female subjects were associated with significantly higher level of TIBC (49.9%) as compared to male (18.3%). T. K. Stojceski⁹ reported that the total iron-binding capacity begins to increase at an early stage in subjects with iron-deficiency anemia. The observations in present study also support the findings of Mehta⁸. It shows that prevalence of anemia is common in all the income groups. However our study has not demonstrated any relationship between anemia and family income, education and living conditions in coastal region.

CONCLUSION

The present study conclude that the overall incidence of anemia showed 42.85 % in both sexes (male and female) in Agri – Koli community staying in village area of Navi Mumbai having a sex ratio of 1.8 : 2.3. Our study shows the coastal communities of Navi Mumbai are more prone to anemia and it is essential to take educative steps to apprise this community about their nutritional status, encourage them to modify their diet and food habits and they should includes fish as well as green

vegetables, cereals, grains, dry bean etc. in their routine diet. This study also suggests that advanced approach to identify the causes of changes in biomarkers of anemia profiles is warranted before arriving to any conclusion on prevalence of anemia in koli community. There are other factors like parasitic infection, absorption of iron from gastrointestinal tract and lack of education and medicine also responsible for anemia to some extent. Nutritional deficiency is preventable and if this factor is taken care of, the morbidity and mortality due to anemia can be reduced considerably. The result in present study should be interpreted with caution considering the limitations of the present study.

REFERENCES

- [1] Sherwani R. K., Alam S., Akhtar K., Abid B., Rahman K., Mehdi R. (2008) *Indian journal of Hematology and blood transfusion*, 24 , 1
- [2] Kumar A. (1999) *Indian J. Public health*, 43 : 3-5, 16.
- [3] Ferreira M U., Monica da, Silva Nunes (2007) *American journal of public health*. Vol. 97, No.2, 237.
- [4] Seshadri S. (1999) *A database on iron deficiency anemia (IDA) in India : Prevalence , causes, consequences and strategies for prevention. Department of foods and nutrition. WHO collaborating centre for nutrition research. The Maharaja sayajirao University of Baroda. Vadodara, India.*
- [5] Lange J. Am. J. Dis Child 1932 (Quoted by Wintrobe WW).
- [6] Shinton N.K., England J.M.E. and Kennedy D.A. (1982) *Journal of clinical pathology*, 35, 1095.
- [7] Van Assendelft O.W. and Pravin R.M. (1988) *Specimen collection, handling and storage. In quality assurance in haematology*, Eds. S.M. Lewis and R.L. Verwilghen. P.S. Bailliere Tindall. London.
- [8] Aboussaleh Y., Ahami A.O.T., Alaoui L. and Delisle H. (2004) *Cahiers d'etudes et de recherche francophones / Sante*. Volume 14, Numero, 1: 37-42.
- [9] Mohamed El Hioui, Ahmed Omar Touhami Ahami, Youssef Aboussaleh, Stephane Rusinek, Khalid Dik and Abdelkader Soualem (2008) *Pakistan Journal of Nutrition*, 7 (3): 400-403.
- [10] De Maeyer E.M. and Adiels-Tegman M. (1985) *Rapp Trimest Stat Sanit Mond*, 38: 302-16.
- [11] Zimmermann M.B., Zeder C., Chaouki N., Saad A., Torresani T. and Hurrell R.F. (2003) *Am. J. Clin. Nutr.*, 77: 425-32.
- [12] Jacobs A., Miller F., Worwood M., Beamish M.R., Wardrop C.A. (1972) *BMJ*, 4:206-8.
- [13] Statland B.E., Winke I.P. (1977) *Am J Clin Pathol.*, 67:84-90.
- [14] Dacie J.V., Lewis S.M. (1991) *Practical Haematology. 7th edition. London: Churchill Livingstone.*
- [15] Cook J.D., Finch C.A., Smith N.J. (1976) *Blood*, 48:449-55.
- [16] Al-Kanhal M.A., Al-Othaimen Al. (1994) *Evaluation of the nutritional status of the people of Saudi Arabia. KACST (Final Report).*