Original Article

Correlation between Oral Manifestations with their Hematologic values in Iron Deficiency Anemia

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ABSTRACT:
The study aimed to evaluate & correlate oral manifestations of iron deficiency anemia& their haematological laboratory values. Our results demonstrated a strong association of oral manifestation along with haematological values. The results of the present study are encouraging and they substantiate the concept that oral signs can be used to evaluate the hemoglobin & ferritin levels in the set-ups with limited laboratory facilities. Our results confirmed that oral manifestations were highly sensitive & specific to predict the haematological& serum ferritin status of patients. The severity of these manifestations were strongly associated with reduced serum ferritin & hemoglobin also it was observed that certain signs like cheilitis & complete glossitis were late indicators of iron deficiency anemia.
Key words: Oral Manifestation, Hematologic, Iron Deficiency & Anemia

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INTRODUCTION

This study was conducted to explore the efficacy of oral manifestations to recognize how oral mucosal changes relate to different levels of haemoglobin & iron status and whether these signs & symptoms can be harnessed to correlate the haematological status of anemic patients. Also if the presence & severity of the oral manifestations could allow for brisk diagnosis of iron deficient state even in absence of a well-developed & established laboratory set up.[1]

In spite of the frequent oral involvement, no studies are available which directly exploit the oral manifestation to assess the status severity of disease. Also, the aim of this study was to identify sensitivity of these oral changes to detect anemia & also to correlate these oral manifestations with the haematological parameters to predict serum ferritin & haemoglobin levels.[2]

Similarly few manifestations are reported to be late indicator of iron deficient erythropoiesis and appear with severe anemia when haemoglobin levels fall below a certain cut-off value. Therefore, this study was aimed to assess the haematological status of anemic patients at which certain oral manifestations become apparent.

MATERIALS & METHOD

The study "Evaluation & correlation of oral manifestations of iron deficiency anemia& their haematological laboratory values – A case control study", was conducted at Index Institute of Dental Sciences, Indore. The Institutional Research and Ethical Committee approved this study.

For the study total 551 numbers of patients were considered and categorized into two groups:

(A) **The study group:** It comprised of 400 patients visiting Index Institute of Dental Sciences fulfilled the latest criteria for diagnosis of iron deficiency anemia as laid by World Health Organization, in VMNIS/ NMH/NHD 2011 which states hemoglobin less than 13g/dl in males & less than 12 g/dl in females, with serum ferritin being less than 15 ug/l as indicator of iron deficiency anemia.

(B) **The control group**: It comprised of 151 patients visiting Index Institute of Dental Sciences and with haemoglobin levels within the specified range of age & sex as defined by World Health Organization 2011.

INCLUSION CRITERIA:

1. All the patients >16 yrs. of age.
2. Selection of study and control group:
    * 400 diagnosed cases of iron deficiency anemia. (Study group)
    * 151 age and sex matched healthy individuals without anemia or any other systemic disease.(Control group)

EXCLUSION CRITERIA:

1. Patients already under any form of iron supplementation during last 3 months.
2. Patients who have history of blood transfusion in past 3 months.
3. Patients with oral sub mucous fibrosis or any other causes leading to glossitis.
4. Patients demonstrating macrocytosis on peripheral smear.
5. Patients showing mixed picture i.e. both macrocytosis & microcytosis on peripheral smear.
6. Patients diagnosed with anemia other than iron deficiency anemia.
7. Patients with recent history of surgery.
8. Patients with angular cheilitis secondary to reduced vertical jaw relation.

All the patients were explained about the study and a written consent was obtained from each of them. (Copy of the same enclosed).

I) **For the examination of subjects following things were used:**
a. Artificial illumination.
b. Mouth mask
c. A pair of sterile gloves
d. Pair of mouth mirrors (No.5)
e. Sterile straight probe and explorers
f. Kidney tray
g. Gauze pieces
h. Cotton
i. Tumbler
j. 0.2% Chlorhexidine gluconate solution

METHOD:

The sample of venous blood was collected by venepuncture from both study & control group and sample was analysed for haemoglobin, complete blood count, RBC indices. The patients with lower haemoglobin signifying anemia were further subjected to serum ferritin level analysis to confirm iron deficiency. In control group haemoglobin levels were normal & hence they were not subjected to serum ferritin analysis.

METHODOLOGY:

I) **Examination of the Subjects:**
The subjects were made to sit comfortably with artificial illumination. The diluted 0.2% chlorhexidinegluconate mouth wash was given to rinse the oral cavity.

The systemic examination included presence of pallor in lower palpebral conjunctiva and nails. Nails were examined for koilonychia. Also pulse rate and blood pressure were noted. Presence of hepatomegaly and splenomegaly if any was noted.

Wearing the sterile hand gloves and mouth mask the subjects were examined under artificial illumination. Patients were assessed for the complete clinical examination of the oral cavity for the following signs and symptoms:

The oral mucosa was examined for presence of pallor and the number of sites with pallor was recorded. Tongue was examined for depapillation, atrophy or denudation of papillae and its extent was noted i.e. weather partial or complete. Angular cheilitis was identified when fissuring was present at commissure of mouth in patients with normal vertical jaw relation. Also presence of ulceration the site, size, number, duration and surrounding area of ulcers were noted. Patients were also enquired if burning sensation in mouth was present.
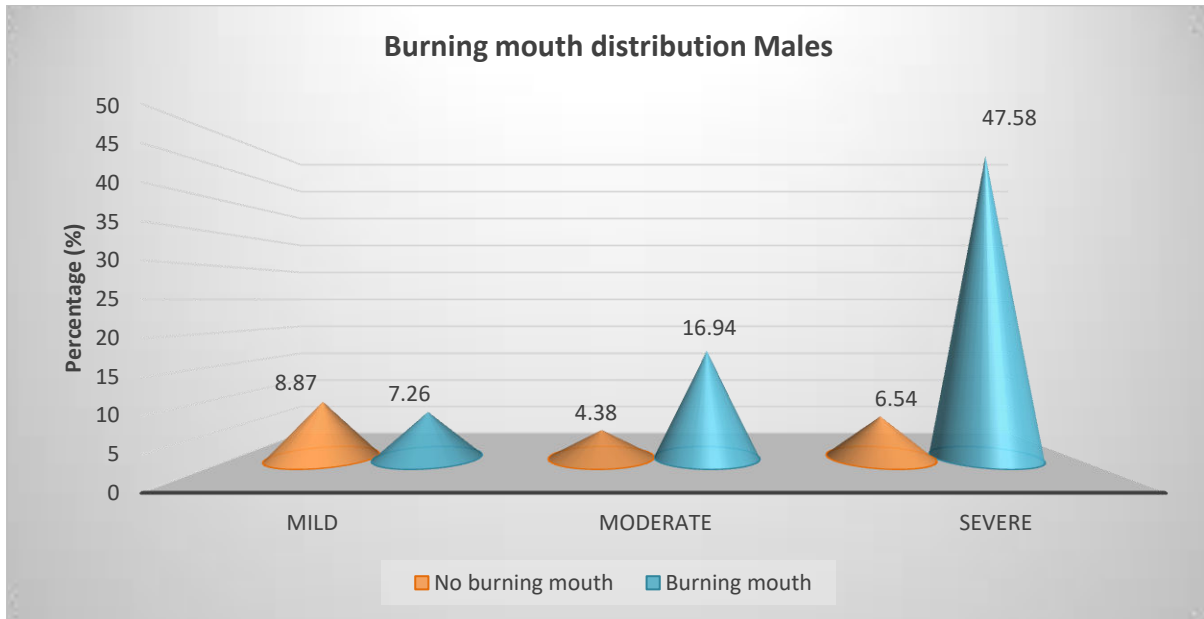
RESULTS

Table 1: Distribution of patients according to burning sensation in males with haemoglobin
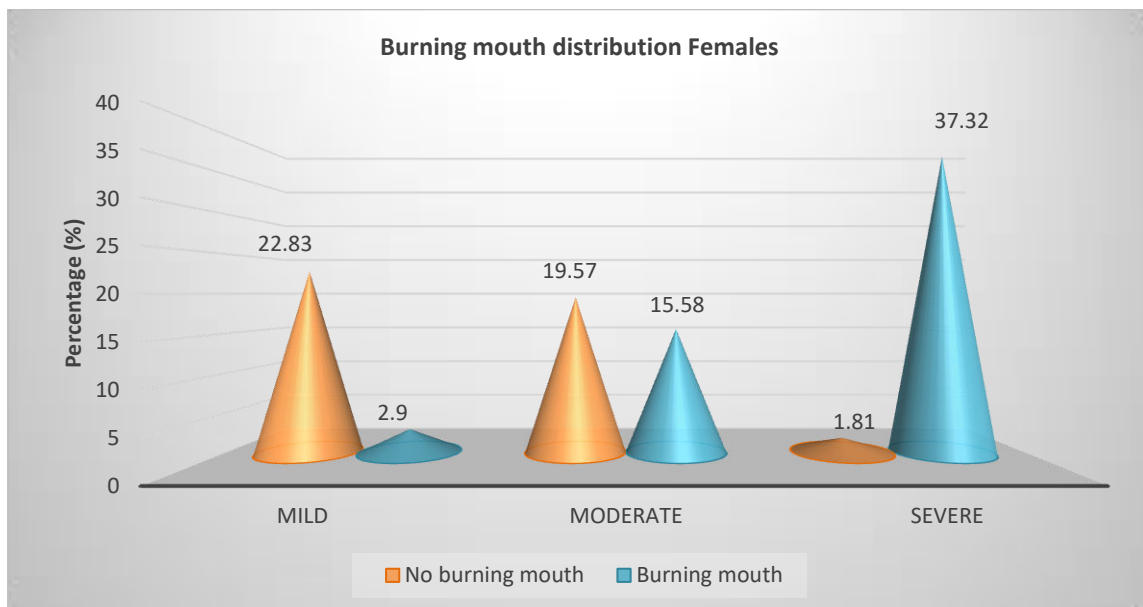
Group E1: Burning mouth males

Anemia Hb range (g/dl)	Observations	No. of patients	Total %	Mean Hb (g/dl)
Mild (11-12.9)	No BM BM	11 9	16.13	11.9
Moderate (8-10.9)	No BM BM	6 21	22.58	9.64
Severe (<8)	No BM BM	10 67	54.03	7.7

Table 2: Distribution of patients according to burning sensation in females with haemoglobin

Anemia Hb range (g/dl)	Observations	No. of patients	Total %	Mean Hb (g/dl)
Mild (11-11.9)	No BM	63	25.72	11.0
	BM	8		
Moderate (8-10.9)	No BM	54	36.96	8.9
	BM	48		
Severe (<8)	No BM		40.94	7.8
	BM	113		

Graph 1: Distribution of patients according haemoglobin in males with burning mouth

Graph 2: Distribution of patients according haemoglobin in females with burning mouth

Oral pallor

Data on clinical pallor was recorded and divided into four categories as present at no site, if present at 1 sites, at 2-3 sites & at 4-5 sites and was evaluated with the serum ferritin level in males & females. Total number of subjects in each group were observed & the findings further evaluated for sensitivity & specificity.

It was observed that that the mean ferritin decreased with increase in number of sites with pallor. 145 (36.25%) patients had mild iron deficiency, 147 (36.75%) patients had moderate iron deficiency & 108 (27%) patients had severe iron deficiency.

The mean ferritin concentration with pallor at no sites or at one site in patients with mild iron deficiency was 12.3 µg/l, while with pallor at 2-3 sites was 7.4 µg/l. in patients with moderate iron deficiency& pallor at 4-5 sites was observed in patients with severe iron deficiency with mean ferritin being 2.1 µg/l.

DISCUSSION

The study group was further carried out to correlate the oral manifestation with haemoglobin & serum ferritin levels.

Oral pallor:

Any reduction in haemoglobin concentration from normal decreases the oxygen-carrying capacity of the blood, thus reducing the tissue perfusion leading pallor of the skin & mucosa in anemia.[3] Presence of pallor has been frequently used in assessing anemia. The sensitivity & specificity of pallor to detect low haemoglobin concentration in present study was observed to 71.1 % & 65.6 % respectively. Our finding suggest haemoglobin cut-off point of <9 g/dl, i.e. absence of pallor completely ruled out the probability of haemoglobin <9 g/dl. **Lulu Muhe et al (2000) in** their study on 2450 children concluded that pallor becomes evident in skin and mucous membranes when the level falls below 7–8 g/dl. **Yalçin SS et al (2007)**[4] in their study on patients with Beta- thalassemia demonstrated significant associations between the presence of palmar or buccal pallor and the presence of anemia in children concluding that haemoglobin values less than 11 g/dl could be easily detected by mucosal pallor. The sensitivity of buccal pallor for identifying anemia in these individuals was 80.7%.[5] **Kalantri et al (2010)**[6] from their study suggest the haemoglobin cut-off point of 7 g/dL, i.e. absence of conjunctival pallor and tongue pallor completely ruled out the probability of haemoglobin <7 g/dL.[7]

Variations in our results with those of other studies may be attributed to the age of our study population who were aged 16 years and above & were examined in a hospital setting using electronic cell counter to measure haemoglobin. By contrast, most studies on accuracy of pallor to detect anaemia are community based, have evaluated children and used colour comparison techniques to measure haemoglobin.

Similarly, sensitivity &specificity of pallor to diagnose reduced serum ferritin was 60.8 % & 68.8 % respectively. Our finding suggest that ferritin cut-off point of <7.5 ug/dl, i.e. absence of pallor completely ruled out the probability of ferritin being <7.5ug/l.

CONCLUSION

Our results demonstrated a strong association of oral manifestation along with haematological values. The results of the present study are encouraging and they substantiate the concept that oral signs can be used to evaluate the hemoglobin & ferritin levels in the set-ups with limited laboratory facilities. Our results confirmed that oral manifestations were highly sensitive & specific to predict the haematological & serum ferritin status of patients. The severity of these manifestations were strongly associated with reduced serum ferritin & hemoglobin also it was observed that certain signs like cheilitis & complete glossitis were late indicators of iron deficiency anemia.

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