

Interrelationship between Gingival Pigmentation and Hemoglobin Concentration in Children- A Cross Sectional Study

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I. Introduction

The gingiva is the most frequently pigmented of the intra-oral tissues as well as the most readily seen.^[1] In recent years, there is an increasing need for esthetics and growing cosmetic demands for a pleasing smile in many individuals. In particular, parents are more conscious of the black or dark pigmentation patches on the facial aspects of the gingiva of their child, which may be strikingly apparent during smiling and speaking.^[2]

Change in the colour of the oral mucosa reflects the underlying health status either local or systemic. Change in color is brought about by pigmentation, and these could be physiological or pathological.^[3]

Iron deficiency (ID) and iron-deficiency anemia (IDA) continue to be of worldwide concern. Among children in the developing world, iron is the most common single-nutrient deficiency.^[4] The prevalence of anaemia is an important health indicator and when it is used with other measurements of iron status the haemoglobin concentration can provide information about the severity of iron deficiency.^[5] Thus the purpose of the present study was to assess the distribution of gingival pigmentation, establish whether correlation exist between hemoglobin concentration and gingival pigmentation.

II. Subjects and Methods:

This cross sectional study was carried out in the department of pedodontics and preventive dentistry, Darshan dental college in coordination with departments of pediatrics, RNT medical college and hospital, udaipur, rajasthan. The ethical clearance for the study was obtained from both the Institutions. Informed consent was taken from the parents/guardians/responsible authority before the study. A total of 83 children selected randomly who fell within the age group of 8-16 years were included in the present study. The method used for intensity of physiologic gingival pigmentation evaluation in this study was the Dummett-Gupta Oral pigmentation Index (DOPI).^[6]

The criteria is as follows:

0=Pink tissue (no clinical pigmentation)

1=Mild, light brown tissue (mild clinical pigmentation)

2=Medium brown or mixed pink or brown tissue (moderate clinical pigmentation)

3=Deep brown or blue/black tissue (heavy clinical pigmentation).

Single examiner independently observed the labial gingiva. At the same time patient blood (0.2ml) were taken using hemoglobin pipette and blood samples were evaluated for hemoglobin concentration using sahli's method of hemoglobin estimation.

III. Results

A total of 83 children were included in this study who fell within the age group of 8-16 years of age. Out of 83 children, 44 were males and 39 were females. Gingival pigmentation score evaluated among the children yielded a non significant difference ($P > 0.005$). A GP score 0 was found in 10.8% of children, a GP score of 1 was seen in 39.7% of children, a GP score of 2 was found with 42.2% of children and a GP score of 3 observed with 7% children. The prevalence of gingival pigmentation in children was found to be 89% in comparison to 11% without any gingival pigmentation (table 1).

Table 1: Distribution of gingival pigmentation score and Gender

Gingival pigmentation score	Gender		Total n (%)
	Male	Female	
0	3	6	9(10.8)
1	20	13	33(39.7)
2	18	17	35(42.2)
3	3	3	6(7)
Total	44	39	83
Chi-Square Tests			
	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.220 ^a	3	.528
N of Valid Cases			
	83		

The distribution of gingival pigmentation score in children yielded a highly significant result ($P < 0.05$) with their haemoglobin concentration (table 2). Out of 83 children, 44 (53%) of children the haemoglobin concentration was found below 11 gm/dl in comparison to 46.9% with haemoglobin concentration above 11 gm/dl (table 3).

Table 2: Distribution of Hemoglobin concentration and gingival pigmentation score

Hb gm/dl	Gingival pigmentation score (DOPI)				Total
	0	1	2	3	
8.00	0	0	0	5	5
9.00	0	0	4	0	4
9.80	0	0	1	1	2
10.00	0	0	1	0	1
10.20	0	0	7	0	7
10.40	0	0	7	0	7
10.60	0	0	7	0	7
10.80	0	0	8	0	8
11.00	0	3	0	0	3
11.20	0	4	0	0	4
11.40	0	5	0	0	5
11.60	0	3	0	0	3
11.80	0	6	0	0	6
12.00	0	6	0	0	6
12.20	0	2	0	0	2
12.60	1	2	0	0	3
12.80	6	2	0	0	8
13.00	2	0	0	0	2
Total	9	33	35	6	83
Chi-Square Tests					
	Value	Df	Asymp. Sig. (2-sided)		
Pearson Chi-Square	215.467 ^a	51	.000		
N of Valid Cases	83				

Table 3: Distribution of Hb concentration and Gender

Hb gm/dl	Gender		Total n (%)
	Male n (%)	Female n (%)	
< 11.00	21 (25)	23 (27.7)	44 (53)
>11.00	23 (27.7)	16 (19)	39 (46.9)
Total	44	39	83
Chi-Square Tests			
	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	38.075 ^a	17	.002
N of Valid Cases	83		

IV. Discussion

Gingival pigmentation occurs a diffuse purplish discoloration or as irregularly shaped or light brown patches. Physiological gingival pigmentation in the form of melanin is non haemoglobin derived pigment and is responsible for normal pigmentation of the oral mucosa and gingival tissue. But it is considered to be multifactorial, whether physiological or pathological and can be caused by a variety of local or systemic factors.^[7]

In the present study, we detected 89% children with gingival pigmentation and only 11% without pigmentation. The prevalence of gingival pigmentation was found more in males (49.3%) as compared to females (39.7%). Our study also suggests that there is an influence of hemoglobin concentration on gingival pigmentation. At lower hemoglobin concentration in children significantly higher level of gingival pigmentation score observed when compared to that with higher concentration of hemoglobin.

India is among the countries with highest prevalence of anaemia in the world and accounts for the largest number of anaemic persons in the world.^[8] According to the World Health Organization (WHO), children are especially vulnerable and exhibit high rates of anemia. Childhood anemia is associated with poor health and impaired cognitive development, leading to reduced academic achievement and work productivity in adulthood.^{[9][10]}

On the basis of the 1999 –2002 US National Health and Nutrition Examination Survey, anemia is defined as a Hb concentration of less than 11.0 g/dL for both male and female children aged 12 through 35 months.^{[11][12]} In present study 53% children were found anaemic (Hb <11gm/dl) as compared to 46.9% non-anaemic (Hb>11%).

Various studies have been done on gingival pigmentation in children. A case-control study by Hanioka et al. studied the association of Melanin Pigmentation in the Gingiva of Children With Parents Who Smoke and found that excessive pigmentation in the gingiva of children was associated with passive smoking.^[13] Haghgoo et al. evaluated the relationship between passive Smoking and Oral Pigmentation in Children.^[14] Similar Study done by Madani and Thomas found that there may be a correlation between gingival melanin pigmentation of children exposed to environmental tobacco smoking.^[15]

In the present study, gingival pigmentation has been correlated with haemoglobin concentration which has not been done in previous studies. To date very little is known regarding the gingival pigmentation and hemoglobin. So, our aim to perform this study was to highlight the effect of hemoglobin concentration on gingival pigmentation.

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