

Relationship between Passive Smoking and Oral Mucosal Pigmentations Among Children in Iraqi (Hilla) City Samples

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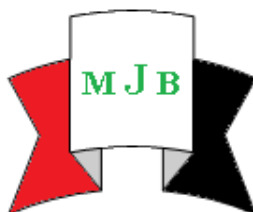
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Abstract

Melanin is an endogenous pigment responsible for human tissue coloration of the skin, mucosa, hair, eyes and parts of the brain. Melanin pigmentation in the oral mucosa occurs as a result of several reasons one of which is smoking. Cigarette smoke induces different side effects in the people who do not smoke, but in the same environment. to find the relation between parents who smoke and oral pigmentations in their children, for this reason , our research was done.

These samples were selected randomly for samples of children in Babylon city- Iraq, in period from April 2013 to July 2014. Oral photographs of 155 children, aged 6- 16 years were selected randomly from the children. All these samples were examined for the presence of macules of melanin pigmentation on the gingiva and the pigmentation pattern and localization were registered. The Chi-square test was used for statistical analysis.

In this research, 155 children, with 6-16 years of age were examined in two groups of samples. The age of the two groups was similar. Ninety six children (who served as experimental group), had oral pigments with parents who smoker), another 59 children (control group) had oral pigments whom parents were non- smoker). (61.9% of children that parents who smoke had oral pigments) and (38.0% of children that parents who non- smoking had oral pigments as normal racial pigmentation). Passive smoking may induce gingival pigmentation in children.

Key words: Smoking, Children, oral mucosal pigmentation.

الخلاصة:

الميلانين , هي صبغات تفرز داخل الجسم مسؤوله عن تلوين او صبغ انسجه الجسم , الانسجه ألرقيقه , الشعر , العيون وأجزاء من الدماغ , صبغه الميلانين في الانسجه تحدث كنتيجة لعدة عوامل او اسباب منها التدخين.

فالتدخين يسبب عده اثار جانبيه تؤثر على الاشخاص الغير أمدخنين الموجودين بنفس الوسط او البيئة . ولكي نجد العلاقة بين الاباء المدخنين وتأثير التدخين على صبغه الفم لدى اطفالهم . لهذا السبب تم اجراء هذا البحث.

مجموعة عينات اخذت بشكل عشوائي لمجموعه اطفال في مدينه الحله للفترة من نيسان ٢٠١٣ الى تموز ٢٠١٤ تم اخذ صور للفم ل ١٥٥ طفل وبأعمار تتراوح من ٦-١٦ سنة اختيرت بشكل عشوائي لهؤلاء الاطفال , كما تم فحص كل العينات سريريا عن طريق تصوير الحالات .

تم في هذا البحث اختيار ١٥٥ ممن تتراوح اعمارهم ما بين ٦ الى ١٦ سنة , وتمت المقارنة بين مجموعتين الاولى فيها ستة وتسعون طفلا وهي مجموعة الاختبار والذين لديهم صبغات فموية وإباء مدخنين وتسع وخمسون طفلا كمجموعه ضابطه لأطفال لديهم صبغات فموية لإباء غير مدخنين , حيث وجدت النسب كالآتي : (٦١.٩%) و (٣٨%) على التوالي.

أظهرت النتائج ان نسبة الاطفال ممن وجدت لديهم صبغات فموية وإباء مدخنين أكثر من نسبة الاطفال ممن وجدت لديهم صبغات فموية وإباء غير مدخنين.

Introduction

Pigmentation is a type of discoloration of the oral mucosa and gingiva that interfere with esthetics of which melanin pigmentation is the most common form. Several local and systemic factors cause melanin pigmentation in the oral mucosa, including physiological or racial pigmentation, smokers melanosis, pigmented nevus, melanotic macula, Addison disease, Peutz-Jeghers syndrome, HIV infection and drugs such as minocycline and anti-malarial drugs [1].

Pigmentation in human gingiva derives from melanin granules, which are synthesized in melanosomes of melanocytes [2,3]. Melanocytes were identified as dendritic cells at the basal layer of gingival epithelium. Melanosomes, which are transferred via dendritic processes to keratinocytes by phagocytic activity, are degraded as they ascend to the surface. Melanin is synthesized from tyrosine and dihydroxy-phenylalanine via dopaquinone as a result of the oxidation activity of tyrosinase [4,5]. Melanin pigmentation in gingiva is correlated with active smoking: smokers displayed a greater propensity toward pigmentation than did nonsmokers [6,10].

Brownish or black pigmentation in human gingiva has been reported in several countries. The prevalence rate of gingival pigmentation is diverse according to race and country [11]. A dose-response relationship with prevalence was detected [12]. Prevalence of pigmentation decreased in relation to the number of years after smoking cessation [13]. These findings indicate a causal association between tobacco smoke and melanin pigmentation in gingiva. Gingival pigmentation often occurred in the labial area of anterior teeth [6,12, 13]. Excessive pigmentation in palatal mucosa as a result of tobacco smoke is a rare phenomenon, except in instances of reverse smoking [14]. The prevalence of gingival pigmentation in smokers increased and approached maximum levels on slight

exposure to smoking in minimal categories of duration of smoking and number of cigarettes smoked [7,9]. This characteristic is indicative of the sensitivity of gingival melanocytes to tobacco smoke. Melanin protects DNA from the ionizing, damaging effect of UV radiation. It absorbs the UV radiation and transforms it to heat through a process described as "ultrafast internal conversion." [15,16], while melanin is present in all individuals, with the exception of albinos, pigmentation may not always be clinically detectable. Melanin is the primary determinant for human tissue coloration, including the skin, mucosa, hair, iris and parts of the brain. While the melanocyte concentration and distribution in the human skin is similar between individuals, the expression pattern of melanin may vary significantly, explaining among ethnic groups. Human skin pigmentation is a highly variable trait among human populations [17]. Researchers have shown that the maximum frequency of oral pigmentation is seen in the Indians (89%) and the minimum frequency is detected in the Europeans (15%) [18, 19]. Presence of melanin pigmentation of the oral mucosa has unfavorable effects on esthetics; furthermore, considering the fact that melanin pigmentation may be a clinical manifestation of systemic diseases and drug usage, this sign is very important in the differential diagnosis of these conditions [20]. One of the recognized phenomenon in smokers is the appearance of melanin pigmentation which is called smoker's melanosis. This pigmentation may be induced by the stimulation of melanocytes by stimuli present in tobacco smoke such as nicotine and benzopyrene. It seems that there is a cause and effect relationship between cigarette smoke and this kind of pigmentation because as the number of years the person has quit smoking increases, the pigmentation decreases too. But the cigarette smoke has effect on other people who are present in the same atmosphere [21].

Researchers have also shown a relationship between passive smoking and some side effects such as appearance of childhood asthma [22] dental caries [23], spontaneous abortion [24], periodontal disease, children's behavior problems and childhood cancers [25]. The children who are exposed to cigarette smoke usually do not complain and when they express their complaints the parents do not pay attention to them or reprimand. So children suffer from environmental tobacco smoke and the house is the most important site of this exposure [26]. Recently, a research in Japan has shown an increase in melanin pigmentation occurrence in the children whose father or mothers are smokers [21].

The purpose of the present work was to evaluate the oral pigmentation in passive smoking children in Babylon province.

Materials and Methods

This study was performed as a historical cohort. These samples were selected randomly from samples of children in Hilla city, Babylon province-Iraq, during the period from April 2013 to July 2014. Oral photographs of 155 children, aged 6- 16 years were selected randomly from the patients attended to a private dental clinic in Hilla city. Informed consent was obtained; A person was interpreted as a member of a smoker family when at least a member of the family had smoked a cigarette once at home in the presence of children since 6 months ago.

The information registered according to the children's' answers. These children

were completely healthy and did not use any medications such as drugs that induce pigmentation. Nobody of this group was continuously exposed to cigarette smoke outside home; for example presence in the parent's office or school service. Distribution of age and gender and also skin color were similar in both groups. The pattern and location of pigmentation were registered. Then both of them were examined for the presence of macules of melanin pigmentation on the gingiva and the pigmentation pattern and localization were registered.

Results

In this research, 155 children, with 6-16 years of age were examined. They were divided in to two groups of samples. Fifty nine children (control group) whom parents were non- smoker had oral pigments. (figures: 1 and 2). Ninety six children (experimental group) whom parents were smoker had oral mucosal pigmentation (figures : 3,4 and 5). 61.9% of children whom parents were smoker had oral mucosal pigmentation (+Ve). On the other hand 38.0% of children whom parents were non- smoker had oral pigmentation (-Ve) as normal racial pigmentation. The Chi-square test was showed statistical difference ($P < 0.05$) for both boys and girls between the two groups of samples (+Ve) and (-Ve). Evaluation of the pigmentation showed that the alveolar mucosa, gingiva and buccal mucosa of upper and lower jaws were the most common place being affected. The locations of pigments were nearly the same in both groups.

Table 1: Numbers and percentages of samples.

number of sample(+ve)	percentage of sample (+ve)	number of sample (-ve)	percentage of sample (-ve)	Chi-sequare
96	61.9%	59	38.0%	< 0.05



Figure 1: Oral pigments in gingival lower jaw (black arrows).



Figure 2: Oral pigments in alveolar mucosa.(black arrows)

Figures : 1 , 2 (control group)



Figure 3: Pigmentations in alveolar mucosa of lower jaw (black arrows)



Figure 4: Pigmentations in buccal mucosa (black arrows)



Figure 5: Pigmentations in alveolar mucosa of upper jaw (black arrows).

Figures 3 , 4 , 5 (Experimental groups)

Discussion

The present project has shown that the prevalence of oral mucosal pigmentation in children whose parents smoke at home is higher than other children. This result confirmed the result of other research who proposed that the cigarette smoke affects the color of children's oral mucosa [21]. The results of this study has showed that pigmentation was seen more in children whose parents were smokers compared to non- smokers. In this research, the time that children were exposed directly to cigarette smoke was not cited, but in all cases of the passive smoker group there was at least one person who smoked in the presence of the child, so we expect that these children were affected by smoke at home for a long period of time [21].

Dummet et al [27] stated that gingival melanin pigmentation was the result of a physiologic process and does not require intervention. The significant association between parental smoking and gingival pigmentation in children suggests the presence of an environmental tobacco smoke (ETS) effect, which originated from parental smoking. Most parents smoked moderately or heavily; thus, their children may have been exposed to passive smoking for certain hours [28].

Two Pathways by which stimulatory substances in environmental tobacco smoke enter melanocytes in oral mucosa of children exist. One route involves penetration through oral mucosa; the second route is characterized by delivery via the bloodstream. Oral mucosal pigmentation was commonly observed in labial areas [6,7,9,10].

The effect of parental smoking on oral mucosal pigmentation in children was apparent; however, because the percentage of smoking parents of children who displayed solitary pigmentation was higher than that of children who presented with the more distinct form of continuous pigmentation. Oral mucosal pigmentation might be suggestive of parental smoking; however, oral mucosal pigmentation was frequently observed in children, although

prevalence of the symptom was higher in children with smoking parents in comparison with nonsmoking counterparts. Melanocytes normally occur in the gingiva of all humans [29].

The present investigation suggested an association between excessive pigmentation in the oral mucosa of children and passive smoking.

The results of this study showed that the anterior parts of the oral mucosa of both the lower and upper jaws were affected more than the other areas. That arrangement was similar in the two groups and the present results has confirmed the results of previous studied that had been performed on adults [18,19].

Today there is more attention being paid to the effect of passive smoking on children. Moreover, the present research showed its effect on the oral mucosa.

In the fact that melanocytes are normal cells in the human gingiva [3] and that there is a relationship between skin color and gingival pigmentation, gingival pigmentation in children is not necessarily a sign of their parents smoking.

Finally, but gingival pigmentation in children may be an alarm for their family.

Conclusion

According to the results of this study, passive smoking may induce gingival pigmentation in children.

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