J Stomatol Oral Maxillofac Surg xxx (2017) xxx–xxx

Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com/en

Original Article

The significance of age group, gender and skin complexion in relation to the clinical distribution of developmental oral mucosal alterations in 5–13 year-old children

R.A. Safadi [a,*], A.I. Shaweesh [a], A.A. Hamasha [b], R. Azzam [a], M.F. Alazzam [a], D. Devang Divakar [c]

[a] Department of Oral Medicine and Oral Surgery, Faculty of Dentistry, Jordan University of Science and Technology, P.O Box 3030, 22110 Irbid, Jordan
[b] Department of Preventive Dentistry, Faculty of Dentistry, Jordan University of Science and Technology, P.O Box 3030, 22110 Irbid, Jordan
[c] College of Applied Medical Sciences, King Saud University, Riyadh, Saudi Arabia

ARTICLE INFO

Article history:
Received 23 September 2017
Accepted 6 December 2017

Keywords:
Age
Gender
Leukoedema
Oral mucosa
Skin complexion

ABSTRACT

Introduction: To describe the relationship and impact of age group, gender and skin complexion on the prevalence and clinical distribution of oral mucosal alterations of developmental origin (OMA-DO) among school children aged 5–13 years.
Methods: A randomized representative national survey of Jordanian school children including all Country geographic areas was performed. Cut-off age that significantly correlated with presence and distribution of OMA-DO was identified (ROC curve). Skin complexion was classified into light/fair, intermediate/tan, dark/brown based on skin complexion index. Chi square test with P value ≤ 0.05 was used for significance of correlations.
Results: Two thousand two hundred and fifty one children were clinically examined. The average age that significantly correlated with prevalence and distribution of OMA-DO was 9.9 years. Female gender was significantly correlated with four OMA-DO: leukoedema (L), linea Alba (LA), Fordyce's granules (FG), commissural lip pits (CLP) and wider distribution of racial pigmentations (RP) ($P < 0.05$, χ^2 test). Older age group (9.9–13 years) was significantly correlated with 7 OMA-DO: L, LA, FG, frenal tag, CLP, mandibular and maxillary tori (MT) as well as wider clinical distribution of RP, FG, L ($P < 0.05$ χ^2 test). Dark skin complexion significantly correlated with 5 OMA-DO: L, LA, FG, RP, MT and wider clinical distribution of RP ($P < 0.02$, χ^2 test).
Conclusions: Increased prevalence and wider clinical distribution of OMA-DO are significantly associated with older age group of 9.9–13 years, female gender, and dark skin complexion. Oral health care provides are encouraged to be familiar with these correlations. This knowledge is expected to improve OMA-DO diagnosis and clinical management. Continuous education programs in this field are recommended.

1. Introduction

Oral Mucosal Alterations of Developmental origin (OMA-DO) may occur due to embryologic malformations, genetic predisposition, physiologic, environmental factors and ethnicity [1–3].

Ethnicity has been related to variation of prevalence of oral mucosal alterations among different populations [4,5]. Ethnicity has also influenced the timing of emergence of deciduous and permanent dentition among populations [6]. Consequently, it is advisable to characterize the OMA-DO in each population separately. This will allow arriving at general guidelines for the clinical presentations of such alterations in each specific population.

There are few studies on oral mucosal changes of developmental origin in both children and adults [7,8]. The American Academy of Pediatrics (AAP) encouraged pediatricians to play a vital role in the oral health care of children [9]. This indicates the need of pediatrician in addition to the other oral health care providers to recognize oral mucosal alterations of developmental origin (OMA-

* Corresponding author. Department of Maxillofacial Surgery and Diagnostic Sciences, College of Dentistry, King Saud bin Abdul Aziz University for Health Sciences, P.O Box: 22490, Riyadh 11426, Saudi Arabia.
E-mail addresses: safadir@ksau-hs.edu.sa, rsafadi@just.edu.jo (R.A. Safadi).

https://doi.org/10.1016/j.jormas.2017.12.002
2468-7855/

DO) in addition to oral lesions linked to pathologic processes [10]. No treatment other than reassurance is usually indicated for the first group of lesions while the second group may require further intervention [11].

In the Middle East, a few comprehensive studies on OMA-DO has been reported [12]. There was no study of the OMA-DO carried out on Jordanian population, until very recently when a study tackling this issue came out [13]. However, the participants were selected from a single geographical area of the country (North) and were of specified ages (6 and 12 years only). In addition the study combined oral mucosal alterations of developmental origin together with oral lesions of pathologic etiology in their clinical correlations. The latter methodology would have inflated the overall prevalence of oral mucosal alterations.

The aim of this study was to describe the relationship and impact of age group, gender and skin complexion on the prevalence and clinical distribution of oral mucosal alterations of developmental origin among school children aged 5–13 years.

2. Methods

2.1. Sample selection

A cross-sectional large-scale National survey of Jordanian school children aged between 5 to 13 years was conducted. The sample selection was randomized, weighted and multistage to ensure representation of Northern, Middle and Southern geographic areas of Jordan. Irbid, Amman and Al-Karak governorates were selected to represent the three geographic areas. These cities are the most populated governorates in their respective regions (Demographics of Jordan. https://www.en.wikipedia.org/wiki/Demographics_of_Jordan, accessed November, 04-2017). Both of rural and urban districts within each governorate were included.

Two lists of schools were obtained from the Ministry of Education; the first list: grades from 1 through 10, second list: kindergartens. Schools of children with special needs were excluded. The total number of schools in the three governorates was 1514 distributed as follows: 851 schools in Amman, 450 in Irbid and 213 in Al-Karak. Using computerized randomizers, 40 schools were selected from the first list and 12 from the second. The selected schools represented the three governorates. Each school was considered as one cluster. A maximum of ten students were randomly selected out of each grade in each cluster (school) by choosing every fifth student in each grade. For Kindergartens, every third student was selected from each level.

2.2. Ethical consideration

The study received ethical approval from the Committee of research on humans in Jordan University of Science and Technology through the Deanship of Research. The results related to dentition were published in three articles 2011, 2012 and 2013 [6,14,15]. The current study is the first publication of the oral mucosal findings of the same population.

This research was funded by Deanship of Scientific Research, Jordan University of Science and Technology, grant number 113/2007. Approval for schools visits was obtained from the Ministry of Education. Written informed consents were signed by parents or legal guardians of each child prior to their clinical examination.

2.3. Data extraction

The examination sheet prepared for this study consisted of two sections. The first included demographic data such as date of birth, gender and skin complexion. The second section dealt with the identified oral developmental change/changes. The clinical criteria proposed by the WHO were adopted for diagnosis of oral mucosal alterations [16].

As guidance to the examiners, an inclusive, comprehensive list of 15 oral mucosal changes of developmental origin was retrieved from Oral and Maxillofacial Pathology text book [17]. In addition, a space was kept in the examination sheet to document any other unlisted findings. Each OMA-DO had details pertaining to: anatomic location, shape/extension/lobulation, as well as "other remarks".

Skin complexion was classified into three categories: Light/Fair, Intermediate/Tan and Dark/Brown. A skin complexion index picture was referred to by the examiners (Human Biological Adaptability. https://www.linkedin.com/pulse/we-all-brown-michael-fricker, accessed in November, 04-2017). The picture showed twelve children standing next to each other with gradual increase in darkness of skin complexion. The first three children were of light/fair complexion while the last three were of dark/brown complexion. The six children in between were with intermediate/tan complexion.

The examiners were two registered Jordanian Dentists who were Teaching Assistants with three-years' of experience in Oral Diagnosis clinics at Jordan University of Science and Technology. Oral diagnosis including examination of oral soft tissues was part of their daily clinical duties. The examiners were trained in the Oral diagnosis clinics for the purpose of the study by the author who is Associate Professor of Oral and Maxillofacial Pathology (RS). First the specialist performed patient examination and recorded the findings then the examiners did the examination independently followed by discussion about each finding. Colored clinical photographs were also used as a review practice for the examiners to assure the spot- diagnosis of OMA-DO. The level of inter examiner agreement was studied using the Kappa statistics that showed high inter examiner agreement (Kappa coefficient > 0.9).

The clinical examinations and interviews of school children participants took place in rooms prepared by school administrations for this purpose. Oral examinations were performed in ordinary chairs by two examiners using headlights, disposable latex gloves, disposable dental mirrors, disposable cheek retractors and gauze.

2.4. Statistical analysis

Collected data were entered into the Statistical Package for Social Sciences (SPSS), version 20 (SPSS Inc., Chicago, IL, USA). Receiver Operating Characteristic (ROC) curve was performed to identify age- cutoff value that correlates with the presence of each OMA-DO, while maintaining highest sensitivity and specificity. The associations between the presence of OMA-DO and age group, skin complexion and gender were assessed using Chi square test. *P* value of less than 0.05 was considered significant.

3. Results

A randomly selected sample size of 2672 children with mean age of 9.7 years was initially selected. The final number of participants who accepted to enroll in the study consisted of 2251 children with a mean age of 9.6 years, ranging from 5.6 to 13.8 years. The number of OMA-DO identified in the sample was thirteen.

Based on Roc Curve analysis, the age of 9.9 years gave the highest sensitivity and specificity in correlation with the presence and clinical presentation of oral developmental changes (namely: maxillary tori, mandibular tori, leukoedema, linea alba, Fordyce's granules, anatomic distribution of Fordyce's granules, frenal tag, commissural lip pits and anatomic distribution of racial pigmentation).

Please cite this article in press as: Safadi RA, et al. The significance of age group, gender and skin complexion in relation to the clinical distribution of developmental oral mucosal alterations in 5–13 year-old children. J Stomatol Oral Maxillofac Surg (2018), https://doi.org/10.1016/j.jormas.2017.12.002