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THE MOST COMMON 5 PEDIATRIC ORAL LESIONS IN MIDDLE NILE DELTA, EGYPT

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ABSTRACT

Background: The prevalence studies on common pediatric oral lesions (POLs) are still rare compared with those on dental caries and periodontal diseases. POLs vary among different geographic regions, age, racial and lifestyle of each population. **The purpose of this study** was to determine the most common 5 POLs referred to 5 different dental and medical branches in Middle Nile Delta, Egypt.

Materials and methods: A qualitative study design was used depending on expert opinions on oral lesions in children (aged 0-14 years). A total of 1164 dental and medical staff members, dentists and physicians at the hospitals of Universities and Ministry of Health, and Specialized Medical Centers & hospitals in the Middle Nile Delta region were included. The target population of the study was experts in 5 branches: Pedodontics, Oral Medicine and Periodontology, Oral and Maxillofacial Surgery, Pediatrics, and Dermatology and Venereology**.** Data were collected using a checklist including the common diseases within the scope of the study and each expert was asked to give percentages for children seen with each disease entity in his/her branch. **Data analysis:** Data were statistically analyzed using Statistical Package for the Social Sciences version 19. For each disease, the number and percentage were calculated and differences between observation recorded by health care workers in University and Ministry of Health were tested by chi-square test. P values < 0.05 were considered significant.

Results: The most common 5 lesions in Middle Nile Delta region were herpes infection (70.1%), candidiasis (69.2%), aphthous ulcer (67.3%), geographic tongue (56.1%), and acute dental abscess (49.7%). According to each branch; in Pedodontics; acute dental abscess (95.5%), pulp polyp (94.5%), parulis (88.6%), herpes infection (82.7%), and acute pericoronitis (82.3%) were recorded. In Oral Medicine and Periodontology; herpes infection (95.5%) was on the top, followed by physiologic pigmentation (83.5%), candidiasis (76.8%), aphthous ulcer (75.0%), and geographic tongue (70.5%), while in Oral and Maxillofacial Surgery; acute dental abscess (68.1%), acute pericoronitis (59.2%), odontoma (55.0%), eruption cyst (49.2%), and hemangioma (46.7%) were recorded. In the Pediatric branch; the top lesion was candidiasis (96.2%), followed

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by the geographic tongue (79.2%), herpes infection (74.2%), aphthous ulcer (68.7%), and scarlet fever (35.0%). In Dermatology and Venereology; candidiasis (87.0%), herpes infection (74.5%), geographic tongue (72.1%), physiologic pigmentation (70.0%), and chickenpox (66.7%) were the top 5 lesions.

Conclusion: In Middle Nile Delta, Egypt; the most common 5 pediatric oral lesions were herpes infection, followed by candidiasis, aphthous ulcer, geographic tongue, and acute dental abscess. The most common 5 lesions in each department; the results of Oral Medicine and Periodontology, Dermatology and Venereology, and Pediatrics were nearly similar but differ in the ranking, however, the Pedodontics and Oral &Maxillofacial Surgery reported different lesions from the others but similar to each in 2 lesions.

KEYWORDS: oral lesions, children, prevalence, Middle Nile Delta, Egypt

INTRODUCTION

Pediatric oral lesions (POLs) have a lot of varieties, with clinical features, behavior, symptomatology, and prevalence differing from adults and youths [1], and for some conditions, the prevalence increases with age. These lesions may be a normal/developmental finding, indicative of local or systemic infections, gingival and/or periodontal diseases, benign neoplasm or life-threatening systemic diseases [2]. Moreover, POLs can be present as macules, ulcers, vesicles, changes in color, size alterations, and configuration of the oral anatomy [3].

The exact prevalence of POLs is not well known. Although reports confirm the supporting of World Health Organization WHO recommendations to the epidemiological studies, few researches have been carried out on POLs so far [4,5]. On the other hand, almost published articles focused on a specific type of oral lesions [4,6-11].

There is a considerable variation in lesions' prevalence among different regions of the world due to environment specificities, racial and lifestyle of each population. The study of the common POLs is important for the characterization of these lesions that are useful for early diagnosis and appropriate treatment [1]. Children with chronic diseases had a higher frequency of oral lesions compared to healthy ones.

The few studies that reviewed all types of oral lesions have many problems with ensuring the oral lesion standardization. Majorana et al. [12] recorded the most common lesions such as thrush, geographic tongue, traumatic ulcers, recurrent aphthous ulcer (RAU), herpes simplex virus (HSV) type 1, and erythema multiforme. On the other hand, Unur et al. [13] showed another arrangement; as fissured tongue followed by traumatic lesions, cheek biting, RAU, dento-alveolar abscess, cleft/palate lip, recurrent herpes, Fordyce's granules, and thrush.

As for the benign lesions, the cystic and inflammatory lesions are more common than tumor or tumor-like lesions. Dentigerous cyst is more prevalent than other cystic lesions and the mucocele is the most frequent inflammatory lesions [4,11,13,14]. Among tumors, odontogenic tumors are the most common in this age, including odontoma on the top[5,14].

Children with low socioeconomic background have high angular cheilitis and HSV, while RAU and geographic tongue are prevalent among children with a high level of socioeconomic status [15].

Although the large variety of oral lesions and some certain lesions occur more in this age group [12] and their prevalence is scarce and varies throughout the world [14], there have been inadequate data about the prevalence of most common POLs in Egypt. Therefore, there is an increasing need for prevalence studies on this topic [16]. The aim of this study was

to determine the most common 5 POLs referred to 5 branches related to children in both dentistry and medicine in Middle Nile Delta, Egypt.

MATERIALS AND METHODS

A qualitative study design was used depending on expert opinions to identify the burden of different oral lesions among children 0-14 years of age at different dental and medical departments. The target population of the study was experts in the following branches:

- *Pedodontics*
- *Oral Medicine and Periodontology*
- *Oral and Maxillofacial Surgery*
- *Pediatrics*
- *Dermatology and Venereology*

Inclusion criteria:

- Staff members, dentists, and physicians at the hospitals of Universities and the Ministry of Health, and Specialized Medical Centers & hospitals were included in this study.
- These facilities offer health care services whether primary or secondary care level in the Middle Nile Delta region.
- Middle Nile Delta governorates: Kafrelsheikh, Gharbia, Menophia, and Kaluobia were included in this study.
- Staff members, dentists, and physicians who had at least 5 years of experience had participated in this study.
- Those having postgraduate studies in their specialties were more preferred than those who didn't have.

A sample of 240 seniors from each branch was recruited. Checklists (table 1) were given to participants for recording the perception of the burden of oral lesions in children under the age of 14 who were referred to them in a time span of 12 months.

The checklist was classified into 8 headings; cystic and exophytic, developmental, infections, ulcerative, neoplastic, pigmented, reactive/ inflammatory, and gingival & periodontal lesions. All relative frequencies (percentages) of the most common POLs diagnosed were recorded.

The data were collected from 1164 participants using checklists including different POLs within the scope of the study. Each expert was asked to give both relative percentages for patients seen with each disease entity in his/her branch during last year from total patients served.

Statistical analysis:

The collected data were organized, tabulated and statistically analyzed using Statistical Package for the Social Sciences (SPSS) version 19 created by IBM, Illinois, Chicago, USA. For each disease, the number and percentage were calculated, and differences between observation recorded by health care workers in Universities and the Ministry of Health & Specialized Hospitals were tested by Chi-square test. The level of significance was adopted at $p<0.05$.

RESULTS

This study was conducted on 1164 health care workers covering 52 different types of oral lesions in children aged 0-14 years at 5 dental and medical departments. These lesions were classified under 8 headings based on their nature. The overall results of the most common 5 POLs in the 5 branches in Middle Nile Delta were herpes simplex infection (70.1%) followed by candidiasis (69.2%), aphthous ulcer (67.3%), geographic tongue (56.1%), and acute dental abscess (49.7%). (Table 2)

According to the most common 5 POLs in each branch (Table 3): *In Pedodontics*, the most common 5 lesions were acute dental abscess (95.5%), pulp polyp (94.5%), parulis (88.6%), herpes simplex infection (82.7%) and acute pericoronitis (82.3%).

TABLE (1) The checklist for determination of the most common pediatric oral lesions

Category of the lesions			
Cystic &Exophytic	**Rank in the group**	**Neoplastic**	**Rank in the group**
- Pulp Polyp		**1-Benign:**	
- Eruption cyst		- Odontoma	
- Pyogenic granuloma		- Ameloblastic fibroma	
- Giant cell granuloma		- Fibrous dysplasia	
- Mucocele		- Odontogenic fibroma	
- Ranula		**2- Malignant*:***	
- Dentigerous cyst		**Pigmented**	
- Alveolar crest cyst		- Hemangioma	
- Epulis		- Physiologic Pigmentation	
Developmental		- Amalgam Tattoo/Graphite	
- Geographic tongue		- Melanotic Nevus	
- Fissured tongue		**Reactive/Inflammatory**	
- Coated tongue			
- Ankyloglossia		- Linea Alba (White Line)	
- Abnormal labial frenum		- Frictional (Traumatic) Keratosis	
- Cleft lip and palate		**Gingival and Periodontal**	
Infections		**I-Gingival Enlargement(GE):**	
A-Viral:		**1- Inflammatory:**	
- Herpes simplex virus		- Acute:(Pericoronitis):	
- HIV infection		- Chronic	
- Mumps		**2- Modified by systemic diseases**	
- Herpangina		**A-Endocrine:**	
- Chickenpox		-Juvenile diabetes,	
- Measles		-Puberty-induced GE	
- Hand, foot, and mouth disease		**B-Blood dyscrasias:**	
		- Leukemia	
		- Neutropenia	
B-Fungal:		**C-Nutritional**	
Candidiasis		**3- Modified by drugs-induced GE**	
C-Bacterial:		**II- Periodontitis**:	
- Acute dental abscess		1- Localized aggressive periodontitis	
- Parulis		**2-**Periodontitis associated with genetic disorder:	
- Scarlet fever		A- Down's syndrome	
		B- Papillion Lefevre syndrome	
Ulcerative			
1- Aphthous Ulcer			
2- Traumatic Ulcers:			
A-Mechanical			
B-Chemical			
C-Electrical			

As for as *Oral Medicine and Periodontology* branch is concerned, the most common 5 lesions were herpes simplex (95.5%), physiologic pigmentation (83.5%), candidiasis (76.8%), aphthus ulcer (75.0%), and geographic tongue (70.5%).

On the other hand, the most common 5 lesions in *Oral and Maxillofacial* branch were acute dental abscess (68.1%), acute pericoronitis (59.2%), odontoma (55.0%), eruption cyst (49.2%), and hemangioma (46.7%).

In Pediatrics, candidiasis recorded the most common (96.2%), followed by the geographic tongue (79.2%), herpes simplex infection (74.2%), aphthous ulcer (68.7%) and scarlet fever (35.0%).

Candidiasis (87.0%), herpes simplex infection (74.5%), geographic tongue (72.1%), physiologic pigmentation (70.0%), and chickenpox (66.7%) were the most common recorded lesions in *Dermatology and Venereology* branch.

TABLE (2): The most common 10 pediatric oral lesions in Middle Nile Delta, Egypt

Pediatric oral lesions	First rank	
	n	%
1. Herpes simplex infection	816	70.1
2. Candidiasis	806	69.2
3. Aphthous Ulcer	783	67.3
4.Geographic tongue	653	56.1
5. Acute dental abscess	578	49.7
6. Physiologic Pigmentation	484	41.6
7. Pulp Polyp	439	37.7
8. Acute inflammatory GE (Pericoronitis)	404	34.7
9. Linea Alba (White Line)	391	33.6
10.Puberty-induced GE	301	25.9

TABLE (3): The most common pediatric oral lesions in relation to each department

Pediatric oral lesions/Department	First rank n	%
Pedodontics : (n=220)		
1. Acute dental abscess	210	95.5
2.Pulp polyp	208	94.5
3. Parulis	195	88.6
4. Herpes simplex infection	182	82.7
5. Acute Pericoronitis	181	82.3
6. Aphthous ulcer	176	79.9
7. Physiologic pigmentation	133	74.9
8. Candidiasis	130	59.1
9. Geographic tongue	127	57.7
10.Puberty-induced gingival enlargement	117	53.2
11.Eruption cyst	114	51.8
Oral Medicine and Periodontology: (n=224)		
1. Herpes simplex infection	214	95.5
2. Physiologic pigmentation	187	83.5
3. Candidiasis	172	76.8
4. Aphthous ulcer	168	75.0
5. Geographic tongue	158	70.5
6. Linea alba	151	67.4
7. Localized aggressive periodontitis	129	57.6
8. Pulp polyp	123	54.9
9. Acute dental abscess	112	50.0
10. Acute Pericoronitis	95	42.4
Oral and Maxillofacial Surgery: (n=240)		
1. Acute dental abscess	164	68.1
2. Acute Pericoronitis	142	59.2
3. Odontoma	132	55.0
4. Eruption cyst	118	49.2
5. Hemangioma	112	46.7
6. Pulp polyp	108	45.0
7. Abnormal labial frenum	93	39.8
8. Cleft lip and palate	84	37.0
9. Aphthous ulcer	82	36.2
10. Ankyloglossia	72	32.2
Pediatrics: (n=240)		
1. Candidiasis	233	96.2
2. Geographic tongue	190	79.2
3. Herpes simplex infection	178	74.2
4. Aphthous ulcer	165	68.7
5. Scarlet fever	84	35.0
6. Juvenile diabetes	78	32.5
7. Coated tongue	58	24.2
8. Downs's syndrome	53	22.1
9. Acute dental abscess	48	20.0
10. Neutropenia	39	16.3
Dermatology and Venereology: (n=240)		
1. Candidiasis	209	87.0
2. Herpes simplex infection	179	74.5
3. Geographic tongue	173	72.1
4. Physiologic pigmentation	168	70.0
5. Chickenpox	160	66.7
6. Aphthous ulcer	152	63.6
7. Drug-induced gingival enlargement	84	35.0
8. Scarlet fever	58	24.2
9. Acute dental abscess	34	14.2
10.Pyogenic granuloma	32	13.4

Table 4, concerning the cystic and exophytic category, the most common 5 POLs were pulp polyp (37.7%), followed by eruption cyst (12.1%), dentigerous cyst (11.8%), mucocele (4.7%), and ranula (2.7%), while in the developmental category, the geographic tongue (56.1%) was at the top, followed by abnormal labial frenum (13.8%), coated tongue (9.2%), ankyloglossia (8.7%) and cleft lip and palate (6.7%).

Herpes infection (70.1%), candidiasis (69.2%), acute dental abscess (49.7%), scarlet fever (17.9%), and parulis (16.9%) were the most common 5 POLs in the category of infections.

It was found that among the ulcerative lesions, the aphthous ulcer was reported by (67.3%) of participants as the most common lesion followed by the mechanical (11.0%) and chemical ulcers (2.8%).

TABLE (4): Distribution of pediatric oral lesions prevalence as perceived by studied dental and medical health care workers (Continued)

Category of pediatric oral lesions	University Hospitals				Public and Specialized Hospitals & Centers of Ministry of Health				Total				p
	Absent		First rank		Absent		First rank		Absent		First rank		
	n	%	n	%	n	%	n	%	n	%	n	%	
Infections:													
Herpes simplex virus	98	24.5	248	62.0	136	17.8	568	74.3	234	20.1	816	70.1	0.001
Candidiasis	133	33.3	252	63.0	201	26.3	554	72.5	334	28.7	806	69.2	0.001
Acute dental abscess	219	54.8	166	41.5	297	38.9	412	53.9	516	44.3	578	49.7	0.001
Scarlet fever	276	69.0	83	20.8	599	78.4	125	16.4	875	75.2	208	17.9	0.001
Parulis	284	71.0	74	18.5	448	58.6	123	16.1	732	62.9	197	16.9	0.001
Mumps	286	71.5	24	6.0	509	66.6	34	4.5	795	68.3	58	5.0	0.018
Hand, foot, and mouth disease	231	57.8	30	7.5	542	70.9	24	3.1	773	66.4	54	4.6	0.001
Herpangina	313	78.3	14	3.5	563	73.7	16	2.1	876	75.3	30	2.6	0.003
Chickenpox	286	71.5	6	1.5	548	71.7	15	2.0	834	71.6	21	1.8	0.042
HIV infection	382	95.5	0.0	0.0	737	96.5	0.0	0.0	1119	96.1	0.0	0.0	1.000
Measles	363	90.8	0.0	0.0	660	86.4	3	0.4	1023	87.9	3	0.3	0.195*
Ulcerative:													
Aphthous ulcer	102	25.5	291	72.8	231	30.2	492	64.4	333	28.6	783	67.3	0.001
Mechanical ulcer	277	69.3	33	8.3	395	51.7	95	12.4	672	57.7	128	11.0	0.001
Chemical ulcer	360	90.0	19	4.8	696	91.1	14	1.8	1056	90.7	33	2.8	0.021
Electrical ulcer	397	99.3	0	0.0	747	97.8	9	1.2	1144	98.3	9	0.8	0.002
Neoplastic (Benign and malignant)**:**													
Odontoma	288	72.0	83	20.8	541	70.8	154	20.2	829	71.2	237	20.4	0.588*
Fibrous dysplasia	290	72.5	36	9.0	552	72.3	113	14.8	842	72.3	149	12.8	0.001
Odontogenic fibroma	376	94.0	14	3.5	699	91.5	15	2.0	1075	92.4	29	2.5	0.002
Ameloblastic fibroma	370	92.5	16	4.0	701	91.8	3	0.4	1071	92.0	19	1.6	0.001
Malignant neoplasm	400	100	0	0.0	744	97.4	6	0.8	1144	98.3	6	0.5	0.015

**** Not significant***

In the neoplastic category, odontoma (20.4%) was the most common lesion, followed by fibrous dysplasia (12.8%), odontogenic fibroma (2.5%), and ameloblastic fibroma (1.6%).

Regarding the pigmented lesions, the physiologic pigmentation (41.6%) and hemangioma (15.5%) were the most common recorded lesions. Among reactive/inflammatory lesion, participants revealed that linea alba was the most common as reported by (33.6%).

As for the gingival and periodontal category, participants' response demonstrated that the acute pericoronitis (34.7%), puberty-induced gingival enlargement (25.9%), Juvenile diabetes (21.0%), Down's syndrome (19.8%), and drug-induced gingival enlargement (16.3%) were the most common lesions.

The reported frequency of occurrence for each disease showed a statistically significant difference in relation to the type of hospital. However, this difference did not affect the overall ranking of the disease.

TABLE (4): Distribution of pediatric oral lesions prevalence as perceived by studied dental and medical health care workers (Continued)

Category of the pediatric oral lesions	University Hospitals				Public and Specialized Hospitals & Centers of Ministry of Health				Total				p
	Absent		First rank		Absent		First rank		Absent		First rank		
	n	%	n	%	n	%	n	%	n	%	n	%	
Pigmented: Physiologic pigmentation	232	58.0	141	35.3	344	45.0	343	44.9	276	49.5	484	41.6	0.001
Hemangioma	279	69.8	73	18.3	462	60.5	108	14.1	741	63.7	181	15.5	0.001
Melanotic nevus	370	92.5	9	2.3	669	87.6	25	3.3	1039	89.3	34	2.9	0.002
Amalgam tattoo/graphite	394	98.5	0	0.0	736	96.3	8	1.0	1130	97.1	8	0.7	0.204*
Reactive inflammatory:													
Linea alba (White Line)	270	67.5	119	29.8	460	60.2	272	35.6	730	62.7	391	33.6	0.040
Frictional keratosis	342	85.5	26	6.5	577	75.5	38	5.0	919	79.0	64	5.5	0.001
Gingival and periodontal: Acute (pericoronitis)	231	57.8	130	32.5	401	52.5	274	35.9	632	54.3	404	34.7	0.237*
Puberty-induced G. E	305	76.3	86	21.5	485	63.5	215	28.1	790	67.9	301	25.9	0.001
Juvenile diabetes	304	76.0	54	13.5	514	67.3	190	24.9	818	70.3	244	21.0	0.001
Down's syndrome.	294	73.5	104	26.0	607	79.5	127	16.6	901	77.4	231	19.8	0.001
Drug induced G.E	353	88.3	47	11.8	613	80.2	143	18.7	966	83.0	190	16.3	0.001
Chronic inflammatory G. E.	366	91.5	33	8.3	634	83.0	130	17.0	1000	85.9	163	14.0	0.001
Localized aggressive perio	317	78.8	47	11.8	537	70.3	103	13.5	852	73.2	150	12.9	0.003
Leukemia	361	90.3	29	7.2	697	91.2	55	7.2	1058	90.9	84	7.2	0.604*
Neutropenia	375	93.8	23	5.8	722	94.5	33	4.3	1097	94.2	56	4.8	0.316*
Papillion Lefevre syndrome	358	89.7	27	6.8	648	84.8	21	2.7	1006	86.5	48	4.1	0.001
Nutritional disorder	396	99.0	4	1.0	756	99.0	8	1.0	1152	99.0	12	1.0	1.000*

**** Not significant***

DISCUSSION

Over the past few years, the prevalence of oral mucous lesions has shown considerable variation among different regions throughout the world and has led researchers to draw disparate conclusions. Furthermore, studies have not been designed using standard protocols and criteria, further explaining the wide variation in methodology and the percentage of different groups of POLs [5].

Moreover, in the literature, the prevalence of the most common POLs in Egypt is scarce and is absent in the Nile Delta, Egypt. Therefore, this prevalence study tries to determine the most common 5 POLs in the Middle Nile Delta referred to 5 dental and medical branches.

One of the important parameters for assessing the population's oral health is the prevalence of oral lesions whose data is a guideline for outlining oral health care services. Data collection from patients' files is usually subject to restrictions such as inadequate information which is not designed for research and missing important data. Also, another restriction is the poor quality of record keeping, leading to lost files. For these reasons, the authors in this study used a qualitative study design that depending on expert opinions by using checklists.

The checklist is a helpful method for data collection and its advantages include promoting objectivity, preventing memory lapses, improving organization and affordability. However, its disadvantages can't be ignored. It doesn't allow explanations and time-consuming [17].

Determination of the top POLs would prompt implementation of appropriate policy towards improving awareness, diagnosis and proper management and planning oral health care services for these lesions [18]. Furthermore, the prevalence of these lesions is important for the specificity of their most common clinical characteristics in children frequently treated the same way as in adults, and the tendency of disease incidence in pediatric patients [19]. This agrees with Petersen et al. [20] and Bhatnagar et al. [21] who stated that the prevalence of oral lesions is an important parameter for the evaluation of the oral health of any population. In addition, it is mandatory in specific population groups to understand their extension and characteristics, and to the improvement of oral health promotion and awareness programs for specific age groups, as recommended by WHO.

Moreover, caution should be used in applying reported prevalence unless the ages and other demographic characteristics of the subjects are similar to those of the patients in question [15]. Thus, the Middle Nile Delta region was selected.

Five dental and medical branches in this study were selected, as they had a close relationship to children, where some symptoms of their some diseases were manifested as pediatric oral lesions.

This study limited the prevalence of POLs to 0-14 years old, in the literature, the publication on oral lesions survey involve a variety of age ranges: 0-5 years old [22], 0-12 years old [12], 0-13 years old [13], 3-13 years old [3], 0-15 years old [23], 0-18 years old [24], 13-18 years old [25], and 0-20 years old [26]. In spite of the fact that all these age groups were considered in the pediatric range, we adopted the upper limit of 14 years because our intention was to emphasize the prevalence of POLs that were observed in a recent permanent dentition and an oral cavity development compatible with this dental age [19]. These age groups coincided with the age groups of Sousa et al. [19] study.

Comparison with other prevalence results is not easy, due to the socio-demographic characteristics differences of the samples, local habits, dissimilar clinical diagnostic criteria, and the methodology used. These differences should be taken into consideration when comparing the frequency and distribution of oral mucosal lesions among children age groups [27].

In this study, the overall results of the most common 5 POLs recorded in Middle Nile Delta were HSV infection, followed by candidiasis, aphthous ulcer, geographic tongue, and acute dental abscess. This agrees with Rioboo-Crespo et al. [5] who reported that aphthous ulcer, HSV, geographic tongue, candidiasis, and traumatic lesions are the lesions that stand out when the results of published studies are examined. In addition, our results coincide with the results of Boras et al. [16] who demonstrated that the majority of their Croatian children had HSV infection, aphthous ulcer, traumatic lesions, and geographic tongue.

Herpes and candidal infections are quite widespread in the pediatric age groups; however, their prevalence varies throughout the world. It seems that HSV infections are the most common ones in children. Primary herpetic gingivostomatitis is the acute condition that can be seen when first encounter with the herpes virus. It characterized by vesiculo-ulcerative lesions of oral and perioral tissues and usually seen between the ages of 6 months to 6 years. Recurrent herpes labialis and recurrent intraoral herpes are other types [13].

In our study, HSV infection was at the top of the lesions, this can be attributed to the higher infection rate caused by the overcrowding of children in primary schools and the low socioeconomic status of the Middle Nile Delta region. This is confirmed by the studies of Ramos-Gomez [28] and Boras et al. [16] who reported that HSV infections are more prevalent in children from low socio-economic populations.

The results of the present study are in concordance with that reported by Amadori et al. [25] who found that aphthous ulcers, traumatic ulcerations, HSV, geographic tongue, candidiasis were the most common 5 POLs in Italy, but disagrees with the findings of Shulman et al. [29] and Majorana et al. [12] who found that HSV infection was ranked fourth and seventh among the list of oral lesions, respectively. These findings suggest that the prevalence of HSV infection is quite widespread in the Middle Nile Delta, Egypt.

The second most common POLs in our study was oral candidiasis. It is one of the most common opportunistic fungal infections. It is a mainly disease of children and among the top 5 pathogens causing nosocomial bloodstream infections, approximately 8% - 10% [30]. Pseudomembranous candidiasis is the common type. The lesions are soft, white, sometimes milk curd like plaque, when it is wiped off, leaves a painful and red surface. The atrophic type is characterized by painful, atrophic, erythematous mucosa. Small vesicles and erosions can be seen in severe cases [13]. It is usually associated with predisposing factors such as prolonged antibiotics and steroid therapy, local trauma, malnutrition, endocrine disorders, and immunosuppressant [31].

Our result is confirmed by the study of Zaoutis et al. [32], who stated that most children are at high risk for disseminated candidiasis due to the previous predisposing factors. Also, this finding is in accordance with the study of Yilmaz et al. [33] and Majorana et al. [12] who found that candidiasis was the most common lesion in their results, but not in accordance with Boras et al. [16] and Ashkavandi et al. [34] who did not record candidal infections. This can be explained by the recruitment of their data from the Department of *Oral Medicine & Periodontology* and *Oral & Maxillofacial Surgery*, respectively, compared to our study where the data were obtained from 5 dental and medical departments.

Aphthous ulcer was the third most frequent type of oral lesions in our results. It is one of the most common oral diseases, often seen in childhood and adolescence, and clinically has 3 forms; minor, major and herpetiform aphthous. The minor form is the most common type. It characterized by painful oral ulceration recurring with varying frequency [13]. It categorized as an idiopathic disease as the exact etiology remains unclear. It is frequently

misdiagnosed, treated incorrectly, or simply ignored [35].

The finding of this study lent support to Majorana et al. [12] who recorded oral candidiasis, traumatic lesions, recurrent aphthous, geographic tongue, and oral herpes. Many studies have shown that aphthous ulcer is one of the most common oral lesions in children [5,13,36-38].

Geographic tongue is said to be one of the most prevalent oral conditions in the pediatric population; however, its prevalence varies widely across the studied populations [39]. It is an inflammatory disorder with unknown etiology. It is characterized by desquamation of filiform papillae in the dorsum and lateral border of the tongue circumfusing with the formation of red and round patches with white distinct borders that give the tongue a map-like appearance. It is usually painless but can cause burning sensations [13].

In the present study, the geographic tongue is the fourth most common POLs. This finding is in agreement with Criveli et al. [40], Bessa et al. [41], and Majorana et al. [12] who demonstrated that geographic tongue was one of the most common pediatric oral lesions in their findings. Similar results were found in the studies of Bánóczy et al. [42], Uner et al. [13], and Amadori et al. [25] who reported a higher incidence of geographic tongue in young age.

Orofacial infections are a common health care concern in children and are a frequent cause of dental consultation worldwide [43]. Infection of dental origin is one of the most common diseases affecting the orofacial region [44].

Acute dental abscess was the fifth most common POLs in our study. It is likely to be present among children with a high prevalence of trauma and dental caries [45]. This agrees with the study of Abbass et al. [46] and El Shazly & Gabr [47] who concluded that there is a higher incidence of dental caries among children in Egypt and in one of Middle Nile Delta Governorates, respectively. This result may be attributed to the neglected dental caries and other health problem in underdeveloped or developing countries like Egypt, as the poor oral health is linked with the low level of socio-economic status, educational conditions and dietary habits [46,48]. The results of Uner et al [13], Garcia Pola et al. [38], and Arendorf & van der Ross [49] studies recorded high incidence of dentoalveolar abscesses which are similar to our findings, in contrast, the study of Benevides et al. [50] reported very low incidence.

Finally, we have to admit that some of the similar studies didn't include periapical abscess in the oral lesions [5,13,39] because these authors considered this lesion as tooth related lesion and not an oral mucosal lesion.

In this study, 3 of the 5 branches; *Oral Medicine and Periodontology, Dermatology and Venereology, and Pediatrics* showed nearly similar results but differed in lesions ranking, where 4 of the most common 5 POLs were similar in both *Oral Medicine & Periodontology and Dermatology & Venereology*, and in both *Oral Medicine & Periodontology and Pediatrics* . However, the *Pedodontics* and *Oral and Maxillofacial branches* showed different results from the other branches but both branches included 2 similar lesions in their results. This can be explained by the specialties of *Oral Medicine and Periodontology, Dermatology and Venereology, and Pediatrics* have a close relation in some of their curricula. Furthermore, this could be attributed to the fact that most parents do not know the appropriate specialty to treat their diseased children as these lesions could be managed by any of the previous departments. However, *the Pedodontic and Oral & Maxillofacial* branches were related to some extent but away from the other specialties, this may be due to the nature of their specialty.

As for the categories of lesions, the infection was the most common of them, including 3 lesions of the most common 5 POLs in Middle Nile Delta; two on

the top and the other at the last rank representing by herpes infection, candida, and acute dental abscess, respectively. Aphthous ulcer was more prevalent in ulcerative lesion whereas geographic tongue was the most frequent developmental lesion and both lesions representing the third and fourth rank, respectively. This may be attributed to the presence of these lesions in the curricula of the 5 departments.

The physiologic pigmentation and pulp polyp were the most frequent pigmented and cystic & exophytic lesions, respectively. As for the gingival and periodontal category, gingival lesions were more prevalent than periodontal, represented by acute pericoronitis and Puberty-induced gingival enlargement. This supported by the study of Pari et al. [51] who reviewed that the gingival diseases are more common in children than periodontal. Whereas linea alba was the common inflammatory and reactive lesions. Among tumors, odontoma was found on the top of the benign but not from the top 10 lesions, this may be explained by the nature of the category that is mainly related to branch with more specialty such as *oral surgery and pedodontics*.

So, determination and identification of the burden of lesions and frequency of each one are important for policymakers. They are essential to have evidence-based data, helping better allocation of resources and, optimizing of currently available resources and minimizing of any waste. The data are also helpful for academia to focus on educational and training curricula on diseases commonly encountered by health care workers during their daily work, which will be reflected in providing high-quality services. It will also help to avoid teaching curricula jammed with unnecessary topics to students [1,20,21,46].

For the majority of diseases, the distribution of diseases was statistically different in relation to the type of hospital whether related to the Ministry of Health or Universities. This difference did not affect much of the priority of the diseases rather than reflecting the severity of the diseases necessitating admission in more specialized hospitals as a university one.

Finally, this study suggests that further research should be conducted on studying more pediatric oral lesions in each pediatric age group, and on each branch. In addition, a larger population from different governorates may have allowed broader diversity for better representation for Egyptian pediatric population. Moreover, this study showed that there is an urgent need for upgrading the registration system in our hospitals.

CONCLUSION

- The prevalence of the most common 5 oral lesions in the Middle Nile Delta pediatric population under the age of 14 was: herpes infection, followed by candidiasis, aphthous ulcer, geographic tongue, and acute dental abscess,
- As regards the most common 5 pediatric oral lesions in each department :
- Three of the most common 5 lesions were similar but differ in the lesions ranking in both *Oral Medicine & Periodontology and Dermatology & Ven*ereology dept, and in both *Oral Medicine & Periodontology and Pediatrics dept*.
- However, both *Pedodontics and Oral & Maxillofacial branches* showed different lesions from the other branches, but they were similar to each other in 2 lesions.

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