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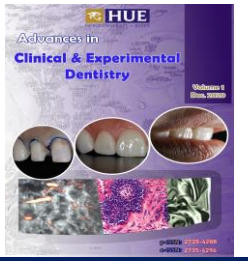

Epidemiology of orofacial malignancies in Egypt (2016-2021): A reappraisal account

Ebraheme Boceila[1], Aya Atef[2], Mohammed Hassan[3], Mohammed Ali[4], BA Khalele[2], and Mostafa Shaban[5]

Abstract

Background Epidemiology of orofacial malignancies is under-resourced in the middle, although it is most needed to improve the treatment plans, provide reliable data for the policymakers and conduct realistic feasibility studies for medical research.

Objective This study reviews the available statistics about the total number of reported malignancies between 2016 to 2021, their mortalities and the percentage of orofacial malignancies at the national level. It also investigates the pathologically established diagnosis of orofacial malignancies in Cairene health institutions.

Method The annual bulletins and detailed reports of Health Services published by Central Agency of Public Mobilization and Statistics and the pathology departments of major public health institutes in Cairo were examined. The Kaplan–Meier method with confidence interval and Log-Rank test are used to calculate the survival analysis for the five studied groups

Results The number of reported malignancies in Egypt in the span of 2006 to 2021 are 201192, 205064, 238044, 256371, 284209 and 338499, respectively. Of these malignancies, orofacial malignancies ranged from 3.546 % to 9.6639%. During the COVID-19 pandemic, the rate of mortality of orofacial malignancies decreased. Yet, the survival rate for the five studied groups was constant.

Advances in Knowledge Orofacial malignancies ranged from 3.55 % to 9.66%. During the COVID-19 pandemic, the rate of mortality of orofacial malignancies decreased. Yet, the survival rate for the five studied groups was constant. Head and neck pathologists must incline to examine the biopsies carefully because the survival rate of what seems to be histomorphologically similar corresponds to different survival rate and warrants different therapeutic interventions.

Keywords: Epidemiology, Orofacial malignancies, Survival rate

1 . Ministry of Health and population. **2**. Cairo University; **3**. National Cancer Institute; **4**. Health Insurance organization in Egypt; **5**. 57357 Hospital, Cairo, Egypt. DOI: 10.21608/ACED.2021.247509

Introduction

There is no straight way for reporting the epidemiology of orofacial malignancies worldwide given the inconsistency in reporting cancerous lesions[1–4] and the continuous reappraisal of the histomorphologically similar lesions that proved to be cytogenetically separate entities (e.g., acinic cell carcinoma and mammary analog secretory carcinoma[5–7]). Complicating the matters, the introduction of new orofacial lesions (e.g., Adamantinoma-like Ewing sarcoma of the salivary glands[8,9], mammary analog secretory carcinoma[10–14], Renal Cell-Like Adenocarcinoma [15–17], HPV-related multiphenotypic sinonasal carcinoma, with adenoid cystic carcinoma-like features[18–22], Microsecretory Adenocarcinoma[23–27], ossifying fibromyxoid tumor[28,29] and Oncocytic intraductal carcinoma [23]) could not be mastered by all head and neck pathologists even in the USA[30]. Several epidemiologic efforts have been exerted to report orofacial malignancies in Libya, UAE[31], Saudi Arabia[2,32] and other Middle Eastern countries [33]either at the uni-institutional level or at the multi-institutional level[34].

This study reviews the available statistics about the total number of reported malignancies between 2016 to 2021, their mortalities and the percentage of orofacial malignancies at the national level. It also investigates the pathologically established diagnosis of orofacial malignancies in Cairene health institutions.

Method

We examined the annual bulletins and detailed reports of Health Services published by Central Agency of Public Mobilization and Statistics [35] and the pathology departments of major public health institutes in Cairo. The Kaplan–Meier method with confidence interval and Log-Rank test are used to calculate the survival analysis for the five studied groups: Group 1: hematological lesions (HL), : Group 2: oropharyngeal cancers (OrC), Group 3: nasopharyngeal cancers (OrC), Group 4: odontogenic malignancies (OD) and Group 5: salivary gland malignancies (SG). The event of interest (Dt), censored event (Ct), proportion surviving interval (Pt), and cumulative survival (St) are illustrated.

Results

The number of reported malignancies in Egypt from 2016 to 2021 are 201192, 205064, 238044, 256371, 284209 and 338499, respectively (Table 1). Of these malignancies, orofacial malignancies ranged from 3.546 % to 9.6639%. During the COVID-19 pandemic, the rate of mortality of orofacial malignancies decreased (Table 2). Yet, the survival rate for the five studied groups was constant (Figure 1).

Table 1. Total number of reported orofacial malignancies in Egypt (2016-2021).

Malignancy	2016	2017	2018	2019	2020	2021
Acinic cell carcinoma	326	404	353	570	335	270
Adamantinoma-like Ewing sarcoma of the salivary glands	0	0	0	0	0	0
Adenocarcinoma, NOS	64	79	69	112	66	53
Adenoid cystic carcinoma	555	688	601	970	571	459
Adenosquamous cell carcinoma	315	391	341	551	325	261
Ameloblastic carcinoma	302	374	327	528	311	250
Basal cell adenocarcinoma	105	130	114	183	108	87
Biphenotypic Sinonasal Sarcoma	7	9	8	12	7	6
Burkitt lymphoma	126	156	137	221	130	104
Carcinoma ex pleomorphic adenoma	153	190	166	268	158	127
Carcinosarcoma	93	115	101	163	96	77
Chondrosarcoma	93	116	101	163	96	77
Clear cell odontogenic carcinoma	48	60	52	84	50	40
Cribriform adenocarcinoma of salivary gland	0	0	0	0	0	0
Epithelial–myoepithelial carcinoma	56	70	61	98	58	46
Fibrosarcoma	100	123	108	174	102	82
Follicular dendritic cell sarcoma	255	316	276	446	263	211
Follicular lymphoma	835	1034	904	1459	859	691
Ghost cell odontogenic carcinoma	96	119	104	169	99	80
HPV-related multiphenotypic sinonasal carcinoma	5	6	5	9	5	4
Hyalinizing clear cell carcinoma	69	85	75	120	71	57
Intraductal carcinoma	46	56	49	80	47	38
Lymphoepithelial carcinoma	74	92	81	130	77	62
MALT lymphoma	528	653	571	922	543	437
Mantle cell lymphoma	259	321	281	453	267	215
Microsecretory adenocarcinoma	0	0	0	0	0	0

Malignancy	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Mucoepidermoid carcinoma	584	724	633	1021	601	484
Myoepithelial carcinoma	60	75	65	105	62	50
Nasopharyngeal carcinoma	853	1056	923	1490	877	706
Nasopharyngeal papillary adenocarcinoma	52	65	57	92	54	43
NUT carcinoma	91	112	98	159	93	75
Odontogenic carcinosarcoma	38	47	41	66	39	31
Oncocytic carcinoma	1	1	1	2	1	1
Oncocytic intraductal carcinoma	50	62	54	87	52	41
Osteosarcoma	108	133	116	188	111	89
Polymorphous adenocarcinoma	129	160	140	226	133	107
Poorly differentiated carcinoma	0	0	0	0	0	0
Primary intraosseous carcinoma, NOS	103	127	111	180	106	85
Renal Cell-Like Adenocarcinoma	178	220	192	311	183	147
Rhabdomyosarcoma	184	228	199	322	189	152
Salivary duct carcinoma	79	97	85	137	81	65
Sclerosing odontogenic carcinoma	176	218	191	308	181	146
Sebaceous adenocarcinoma	8	10	9	14	8	7
Secretory carcinoma	0	0	0	0	0	1
Sialoblastoma	0	0	0	0	0	0
Squamous cell carcinoma	6048	7489	6547	10567	6221	5004
Synovial sarcoma	515	638	557	900	530	426
T-lymphoblastic leukemia/lymphoma	410	508	444	717	422	340

Table 2. Number of reported orofacial malignancies in Cairo (2016-2021)

Malignancy	2016	2017	2018	2019	2020	2021
Acinic cell carcinoma	156	186	138	239	178	100
Adamantinoma-like Ewing sarcoma of the salivary glands	0	0	0	0	0	0
Adenocarcinoma, NOS	31	36	27	47	35	20
Adenoid cystic carcinoma	266	316	234	407	303	170
Adenosquamous cell carcinoma	151	180	133	231	172	97
Ameloblastic carcinoma	142	172	128	222	165	93
Basal cell adenocarcinoma	50	60	44	77	57	32
Biphenotypic Sinonasal Sarcoma	3	4	3	5	4	2
Burkitt lymphoma	60	72	53	93	69	38
Carcinoma ex- pleomorphic adenoma	73	87	65	113	84	47
Carcinosarcoma	45	53	39	68	51	28
Chondrosarcoma	45	53	39	68	51	28
Clear cell odontogenic carcinoma	25	28	20	35	27	15
Cribriform adenocarcinoma of salivary gland	0	0	0	0	0	0
Epithelial–myoepithelial carcinoma	29	32	24	41	31	17
Fibrosarcoma	48	57	42	73	54	30
Follicular dendritic cell sarcoma	122	145	108	187	139	78
Follicular lymphoma	401	476	353	613	455	256
Ghost cell odontogenic carcinoma	46	55	41	71	52	30
HPV-related multiphenotypic sinonasal carcinoma	5	3	2	4	3	1
Hyalinizing clear cell carcinoma	33	39	29	50	38	21
Intraductal carcinoma	22	26	19	34	25	14
Lymphoepithelial carcinoma	36	42	32	55	41	23
MALT lymphoma	253	300	223	387	288	162
Mantle cell lymphoma	124	148	110	190	142	80
Microsecretory Adenocarcinoma	0	0	0	0	0	0

Malignancy	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Mucoepidermoid carcinoma	280	333	247	429	319	179
Myoepithelial carcinoma	31	35	25	44	33	19
Nasopharyngeal carcinoma	386	486	360	626	465	261
Nasopharyngeal papillary adenocarcinoma	25	30	22	39	29	16
NUT carcinoma	44	52	38	67	49	28
Odontogenic carcinosarcoma	18	22	16	28	21	11
Oncocytic carcinoma	0	0	0	1	1	0
Oncocytic intraductal carcinoma	24	29	21	37	28	15
Osteosarcoma	52	61	45	79	59	33
Polymorphous adenocarcinoma	62	74	55	95	70	40
Poorly differentiated carcinoma	0	0	0	0	0	0
Primary intraosseous carcinoma, NOS	49	58	43	76	56	31
Renal Cell-Like Adenocarcinoma	85	101	75	131	97	54
Rhabdomyosarcoma	88	105	78	135	100	56
Salivary duct carcinoma	38	45	33	58	43	24
Sclerosing odontogenic carcinoma	84	100	74	129	96	54
Sebaceous adenocarcinoma	4	5	4	6	4	3
Secretory carcinoma	0	0	0	0	0	0
Sialoblastoma	0	0	0	0	0	0
Squamous cell carcinoma	2903	3445	2553	4438	3297	1851
Synovial sarcoma	247	293	217	378	281	158
T-lymphoblastic leukemia/lymphoma	197	234	173	301	224	126

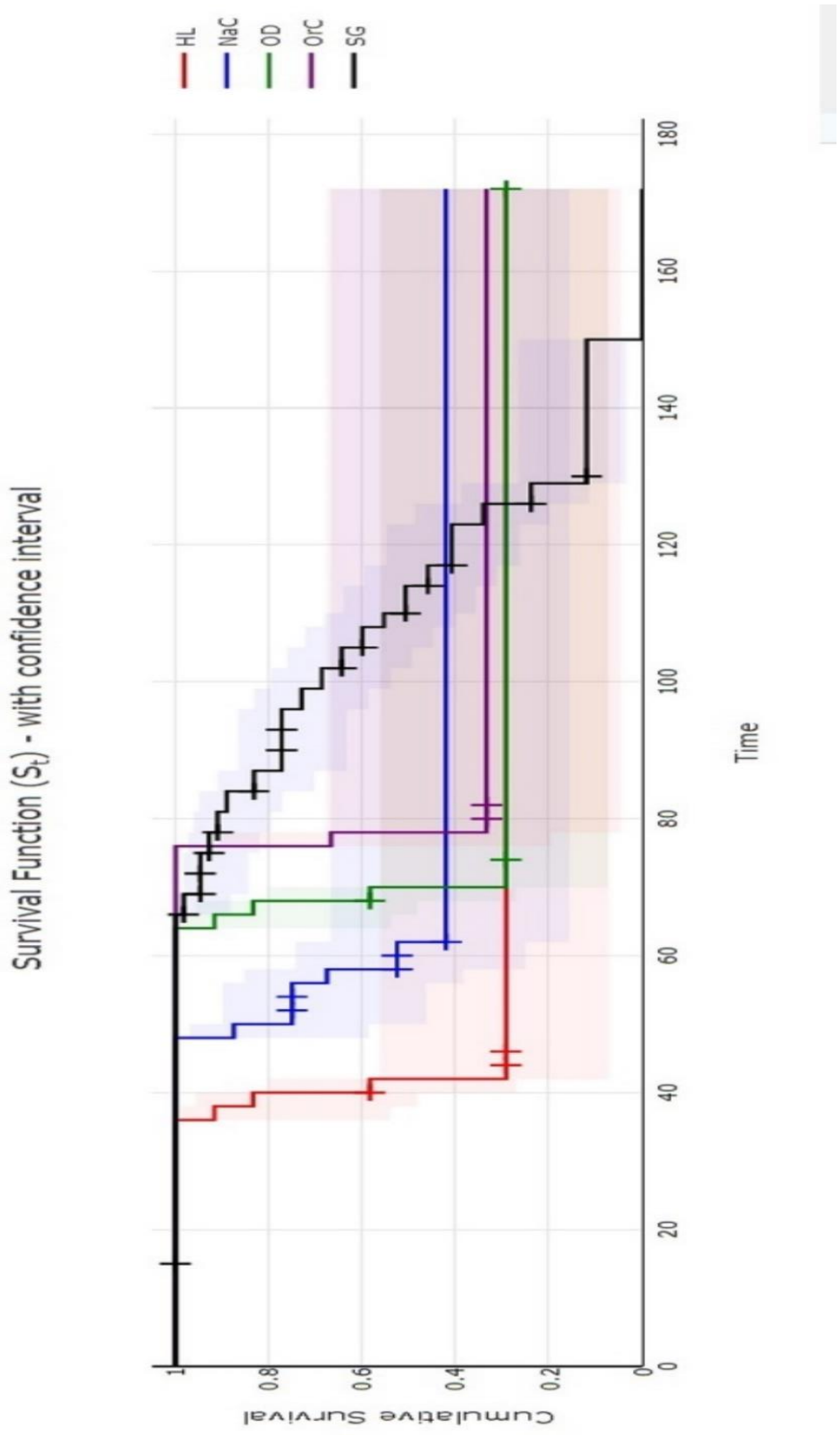

Figure 1. Survival rate in the five studied groups.

Although squamous cell carcinoma is the most common malignancy of the orofacial region, tumors originating from hematologic and salivary origins are also frequent (Table 3). However, the survival rate of these salivary malignancies is most favorable.

Table 3. Percentages of orofacial malignancies in Cairo sorted on frequency (2016-2021).

Malignancy	**Category**	**Percentage (%)**
Squamous cell carcinoma	OrC	59.49
Nasopharyngeal carcinoma	NaC	8.389
Follicular lymphoma	HL	8.214
Mucoepidermoid carcinoma	SG	5.749
Adenoid cystic carcinoma	SG	5.461
MALT lymphoma	HL	5.191
Synovial sarcoma	NaC	5.066
T-lymphoblastic leukaemia/lymphoma	HL	4.036
Acinic cell carcinoma	SG	3.208
Adenosquamous cell carcinoma	SG	3.103
Ameloblastic carcinoma	OD	2.972
Mantle cell lymphoma	HL	2.551
Follicular dendritic cell sarcoma	HL	2.51
Rhabdomyosarcoma	NaC	1.81
Renal Cell-Like Adenocarcinoma	NaC	1.749
Sclerosing odontogenic carcinoma	OD	1.733
Carcinoma ex pleomorphic adenoma	SG	1.509
Polymorphous adenocarcinoma	SG	1.271
Burkitt lymphoma	HL	1.242
Osteosarcoma	OrC	1.058
Basal cell adenocarcinoma	SG	1.033
Primary intraosseous carcinoma, NOS	OD	1.011
Fibrosarcoma	OrC	0.979
Ghost cell odontogenic carcinoma	OD	0.948
Chondrosarcoma	OrC	0.918
Carcinosarcoma	SG	0.916

Malignancy	Category	Percentage (%)
NUT carcinoma	NaC	0.892
Salivary duct carcinoma	SG	0.773
Lymphoepithelial carcinoma	SG	0.733
Hyalinizing clear cell carcinoma	SG	0.678
Adenocarcinoma, NOS	SG	0.629
Myoepithelial carcinoma	SG	0.592
Epithelial–myoepithelial carcinoma	SG	0.553
Nasopharyngeal papillary adenocarcinoma	NaC	0.516
Oncocytic intraductal carcinoma	SG	0.492
Clear cell odontogenic carcinoma	OD	0.474
Intraductal carcinoma	SG	0.449
Odontogenic carcinosarcoma	OD	0.372
Sebaceous adenocarcinoma	SG	0.08
Biphenotypic Sinonasal Sarcoma	NaC	0.07
HPV-related multiphenotypic sinonasal carcinoma	NaC	0.048

The most common salivary gland lesions are mucoepidermoid carcinoma, representing 21% of all salivary gland malignant tumors. The other frequent salivary gland cancers are adenoid cystic carcinoma (20%), acinic cell carcinoma (12%), adenosquamous cell carcinoma(11%), and carcinoma ex-pleomorphic adenoma (6%). Warthin tumor was frequently associated with acinic cell carcinoma, carcinoma ex-pleomorphic adenoma, salivary duct carcinoma and mucoepidermoid carcinoma. Although the variants of each neoplasm were not defined, the grading of the majority of salivary gland tumors was low-grade.

Discussion

The classification of orofacial malignancies is not always standardized. The majority of Egyptian oncologists follow the 2005's WHO classification[36], which does not include many of the newly described pathologic entities in the newer versions[37]. Given the lack of facilities needed for performing molecular investigations (and sometimes the basic immunohistochemical workup), the final diagnosis diagnosis diagnosis is inconsistent with the standardized diagnostic protocols.

Consistent with the literature, there were some multifocal incidences, synchronous and metasynchronous occurrences of malignancies either at the same topography or affecting more than one site[38–41]. The collision lesions, associations and syndromic relations are always underdocumented. For example, Warthin tumor was frequently reported with

salivary gland malignancies. However, the cancerous condition is only highlighted. If a patient suffered from two synchronous lesions, one of them is provided. This under-investigation may pose questions regarding the accuracy of the final diagnosis, especially if the morphological pattern of the diagnosed lesion is not straightforward[42–45].
The numbers retrieved in this study must be used with extreme caution because no unified database links the Egyptian health institutions. Even death certificates do not include all designations of cancers. For example, multiple myeloma (or plasmacytoma) is not included in the hematological malignancies. Therefore, the deaths due to this neoplasm is usually recorded either as lymphoma or leukemia. Another limitation to the accuracy of the reported numbers is that the records do not specify the primary origin of the tumor and the different sites of metastases. This challenges the proper diagnosis[46]. Moreover, the clinical, radiological and confirmatory investigations are always missing. Moreover, the initial diagnosis is not given, heightening the impression that the diagnostic accuracy of all Egyptian oncologists is 100%. Moreover, the dates of the initial diagnosis, disease onset and seeking therapeutic interventions are always dropped.

Conclusion

Orofacial malignancies ranged from 3.546 % to 9.6639%. During the COVID-19 pandemic, the rate of mortality of orofacial malignancies decreased. Yet, the survival rate for the five studied groups was constant. Head and neck pathologists must incline to examine the biopsies carefully because the survival rate of what seems to be histomorphologically similar corresponds to different survival rate and warrants different therapeutic interventions.

Future studies should investigate demographic variables (gender, territory, economic status, health habits, education and occupations) and the frequency of adjunct non-surgical therapeutic modalities.

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