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RESEARCH ARTICLE

Knowledge, Attitudes, and Practices of Dental Surgeons in the Management of Patients with Odontogenic Maxillary Sinusitis in the City of Yaounde

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Abstract

Background: Odontogenic maxillary sinusitis (OMS) is an understudied type of sinusitis that requires a well codified treatment regimen. Management demands collaboration between the dental surgeon and ear-nose-throat specialist.
Objective: This study aimed to assess the knowledge, attitudes, and practices of dental surgeons in the management of patients with OMS.
Methods: We conducted a four-month descriptive cross-sectional study involving dental surgeons working in public hospitals, private hospitals, and private dental cabinets in Yaounde. A consecutive non-probabilistic sampling method was used and, 115 dental surgeons from 10 different dental institutions were selected, 97 retained. A self-constructed questionnaire was distributed to the dental surgeons that comprised 31 questions. The data was entered and analyzed for frequency and percentages by using Statistical Package for the Social Sciences (SPSS) version 23.
Results: Of the 97 participating dental surgeons, 54.6% had average knowledge, 4.1% had good knowledge, 33.0% had insufficient knowledge, and 13.4% had poor knowledge on OMS. Regarding attitudes, 33.0% had average attitudes, 4.1% had good attitudes, 33.0% had insufficient attitudes, and 29.9% had poor attitudes. Regarding practices, 40.2% had average practices, 29.9% had insufficient practices, 25.8% had poor practices, and 4.1% had good practices.
Conclusion: This study revealed that dental surgeons have limited knowledge on the management of OMS, resulting in mediocre attitudes and practices. Very few dental surgeons had received specialized training on OMS management and prevention. More attention should be paid on OMS in the dental curriculum of medical faculties. Prospective studies are needed to determine best approach to caring for OMS.

Keywords: Antral Teeth, Dental Surgeons, Odontogenic Maxillary Sinusitis, Maxillary Sinus.

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1. Introduction

Sinusitis is the inflammation of paranasal sinuses [1], classified as odontogenic or non-odontogenic based on its etiology [2]. It is common worldwide, with over 24 million registered cases in the United States and 107 million in China [1]. However, limited data exists regarding this condition in Cameroon [3]. Odontogenic maxillary sinusitis (OMS) is the inflammation of the maxillary sinus due to dental pathology [4]. It develops when bacteria from a dental infection spread to the sinus cavity through the roots of a tooth or the bone surrounding the teeth. This makes any infection on and around the antral teeth potential risk factors for OMS [5]. Odontogenic sinusitis accounts for 10-12% of all sinusitis cases; however, there has been an increase in its incidence (8 per cent of all patients requiring sinus surgery) over the last decade [6-9]. Reports show that 55.97% of odontogenic sinusitis are iatrogenic and the first (35.6%) and second (22%) molars are the most affected teeth [7]. There is lack of consensus globally concerning the management plan for OMS [10]. OMS is a well-known but understudied form of sinusitis that requires a unique treatment regimen [11]. Certain dental practices contribute greatly to the development of odontogenic sinusitis. OMS can be easily misdiagnosed, leading to long-term administration of inappropriate and ineffective medications or unnecessary surgical management [5]. As it involves both otolaryngology and dental science, management demands collaboration between dentists and ear-nose-throat (ENT) specialists [12]. What is the level of knowledge, the attitudes and practices of dental surgeons in the management of patients with odontogenic maxillary sinusitis?. Therefore, we aimed to assess the knowledge, attitudes, and practices of dental surgeons in the management of OMS. We hypothesized that dental surgeons have limited knowledge and exhibit mediocre attitudes and practices towards OMS.

2. Materials and Methods

This descriptive cross-sectional study was carried out in a few dental services of public hospitals, private hospitals, and private dental cabinets in Yaoundé from November 2022 to May 2023. Using the consecutive non-probabilistic sampling method with a calculated desired sample size of 100 participants, we included dental surgeons in active service registered in the National Order of Dentists in Cameroon (ONCDC), working in the private or public sector during the study period, who willingly accepted to take part in the study. We excluded practitioners who were absent at their duty post during data collection, had double ONCDC registration numbers, and had incompletely filled questionnaires (n=18). The participant selection process is shown in Figure 1. A pre-established questionnaire (Additional material) was used for data collection. Each participant was interviewed in their preferred language (French or English) for 15 min. The questionnaire contained pre-set questions with a limited number of multiple choices. It assessed the following: socio-demographic information, knowledge of OMS and the need for education and training, the attitudes of dental surgeons regarding OMS management, and their practices.

2.1 Assessment of Knowledge, Attitudes, and Practices

Knowledge on OMS was assessed using a 10-point scale with 10 questions; each correct response was scored 1, while a wrong one was scored 0. Attitudes towards patients with OMS were assessed using six questions; a positive attitude was scored 1 and a negative one was scored 0. Practices were assessed using six questions; each correct response was scored 1 and a wrong one was scored 0. The codification of percentages was as follows: <50%, poor; 50–64%, insufficient; 65–84%, average; and ≥85%, good.

2.2 Data Analysis

Data from validated questionnaires were analyzed using Microsoft Excel 2013 and SPSS 23.0. Assessment of knowledge, attitudes, and practices was performed using the Fisher's test, and $p<0.05$ was considered significant. For each variable analyzed the performance threshold was set at 85% [13]. Descriptive variables are expressed as percentages. Frequencies were calculated using 95% confidence intervals. We obtained authorization from the Ethical Committee of the Faculty of Medicine and Biomedical Sciences, University of Yaoundé I (Ethics Code: 0150/UYI/FMSB/VDRC/DAASR/CSD) on May 12, 2023. The list of all practicing dental surgeons in Yaoundé and their addresses were obtained from the ONCDC. All procedures were in accordance with the principles of the Declaration of Helsinki. All the participants provided written informed consent.

3. Results

Ninety-seven dental surgeons were finally included into this study. Overall, 55.7% were males and 43.3% were females. The modal age group of the participants was 20–40 years (92.8%). Figure1. 1 shows the participants' sociodemographic characteristics.

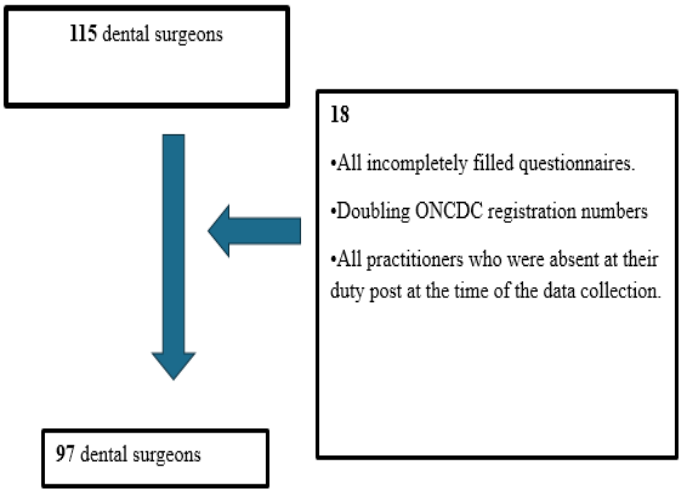

Figure 1. *flowchart of participants*

3.1 Knowledge on OMS

(Table 1) shows the descriptive analysis of the knowledge, attitude, and practices of dental surgeons on OMS.Overall,1% of the participants had wrong definitions of OMS, 10.3% saw no need for collaboration between otolaryngologists and dental providers in the diagnosis and/or treatment of OMS, and 20.6% did not agree that posterior maxillary teeth infection is a high risk factor for OMS. Iatrogenic factors werethe highest reported risk factors (96.9%) and95.9% of participants reported that periapical infections could equally lead to OMS.The maxillary second premolar (37.1%) was reported to have the highest probability of causing OMS, followed by the maxillary first molar (26.8%).Most participants ranked nasal congestion highest (91.8%), followed by purulent anterior rhinorrhea (90.7%).Regarding complications, 92.8%of participants reported orbital cellulitis as a possible complication of OMS;2.1% did not know of any.Antibiotherapy was the highest proposed treatment for OMS (96.9%); 4.1% did not proposeany. Regarding antibioticrecommendations for OMS treatment, 83.5%recommendedamoxicillin-clavulanate and 89.7% reported extraction as the treatment of choice.

Table 1. *Participants' sociodemographic data of dental surgeons*

Variables	Category	Frequency (n)	Percentage (%)
Sex	Male	54	55.7
	Female	43	44.3
Age (years)	20–40	90	92.8
	41–64	7	7.2
Workplace	Public hospital	31	32.0
	Private clinics or private dental cabinets	66	66.8
Years of service	1–5	68	70.1
	6–10	20	20.6
	11–15	2	2.1
	16–20	5	5.2
	21–25	1	1.0
	26–30	1	1.0
Domain of specialization	General practitioner	90	92.8
	Endodontics	1	1.0
	Maxillofacial surgery	3	3.1
	Orthodontics	2	2.1
	Implantology	1	1.0
School attended	FMBS Yaounde	59	60.8
	UDM Bangangte	23	23.7
	Dakar	1	1.0
	AUP	3	3.1

	UNIKIN	4	4.1
	Germany	2	2.1
	IOSTM Madagascar	2	2.1
	University of Western Cape	1	1.0
	Russia	2	2.1

FMBS, Faculty of Medicine and Biomedical Sciences of Yaounde; UDM, Mountain University; AUP, ; UNIKIN, University of Kinshasa; IOSTM, Tropical OdontoStomatology Institute of Madagascar

3.2 Education and Training in OMS Management

(Table 2) shows behavior attributes of dentists towardEducation and training in OMS management. Overall, 82.5% of participants had never received any proper education or specialized training on OMS management;of these 87.6% expressed the desire to be trained. Of 17.5% who had received some education and training, 21.1% were trainedon the surgical management, 52.6% on the medical management, and 10.5% on the use of radiology for OMS diagnosis. The need for specialized training was associated withmodal age group and domain of specialization(p=0.0168).

Table 2. *Participants' knowledge on OMS*

Variables Modalities		Frequency	Percentage (%)
OMS is a symptomatic inflammation of the maxillary sinus as a result of a dental pathology or dental procedures	No	1	1.0
	Yes	96	99.0
The diagnosis of OMS requires multidisciplinary collaboration between otolaryngologists and dental providers	No	10	10.3
	Yes	87	89.7
Infection of posterior maxillary teeth is a risk factor for OMS	No	20	20.6
	Yes	77	79.4
Infection of anterior maxillary teeth is a risk factor for OMS	No	29	29.9
	Yes	68	70.1
Iatrogenic factors such as dental implants and complications of dental extractions are risk factors for OMS	No	3	3.1
	Yes	94	96.9
Infection of anterior mandibular teeth is a risk factor for OMS	No	94	96.9
	Yes	3	3.1
Infection of posterior mandibular teeth is a risk factor for OMS	No	91	93.8
	Yes	6	6.2
Oroantral fistulas can cause OMS	No	26	26.8
	Yes	71	73.2
Implant displacement into the sinus can cause OMS	No	13	13.4
	Yes	84	86.6
Migration of a tooth or root into the sinus during dental extraction can cause OMS	No	9	9.3
	Yes	88	90.7
Endodontic treatment poorly done can lead to OMS	No	23	23.7
	Yes	74	76.3
Dental caries can lead to OMS	No	51	52.6
	Yes	46	47.4
Periapical infections can lead to OMS	No	4	4.1
	Yes	93	95.9
Periodontal disease can cause OMS	No	50	51.5
	Yes	47	48.5
Odontogenic cysts can cause OMS	No	15	15.5
	Yes	82	84.5

3.3 Attitudes and Practices Towards Patients with OMS

Regarding barriers encountered in treating OMS, lack of education was the most reported (34%). Overall, 37.1% received an average number of one OMS case per month,33.0% had difficultiesdiagnosing sinusitis of dental origin, 42.3% saw no need to refer a patient to an ENT specialist,46.4% had treated cases of OMS referred by ENT specialists, 25.8% did not feel comfortable handling OMS cases,and 10.3% did not take any precautions when treating antral teeth(Table 3).

Table 3. *Need for education and training in OMS management amongst dental surgeons*

Variables Modalities		Frequency	Percentage (%)
Since you started working, have you undergone any special training in OMS management	No	80	82.5
	Yes	17	17.5
If no, do you think you need the training	No	12	12.4
	Yes	85	87.6

OMS, odontogenic maxillary sinusitis

3.4 Treatment Methods Used in Daily Practice

(Table 4) shows that the treatment method was at the discretion of the dental surgeons;97.9% used thorough dental and medical examination for clinical diagnosisand68.0%requested panoramic radiography.

Table 4. *dental surgeons need for special training in OMS management according to their domain of specialization and age*

Characteristic	Yes, N = 17[1]	No, N = 80[1]	p-value[2]
Specialization			p=0,0162
Maxillofacial surgery	0 (0.0%)	3 (100.0%)	
General dentistry	14 (15.6%)	76 (84.4%)	
Endodontics	0 (0.0%)	1 (100.0%)	
Implantology	1 (100.0%)	0 (0.0%)	
Orthodontics Age, years	2 (100.0%)	0 (0.0%)	
20–40	13 (14.4 %)	77 (85.6 %)	p=0.0168
41–64	4 (57.1 %)	3 (42.9 %)	

[1]*n (%)2Fisher's exact test The various distributions are shown in the (figure 2).*

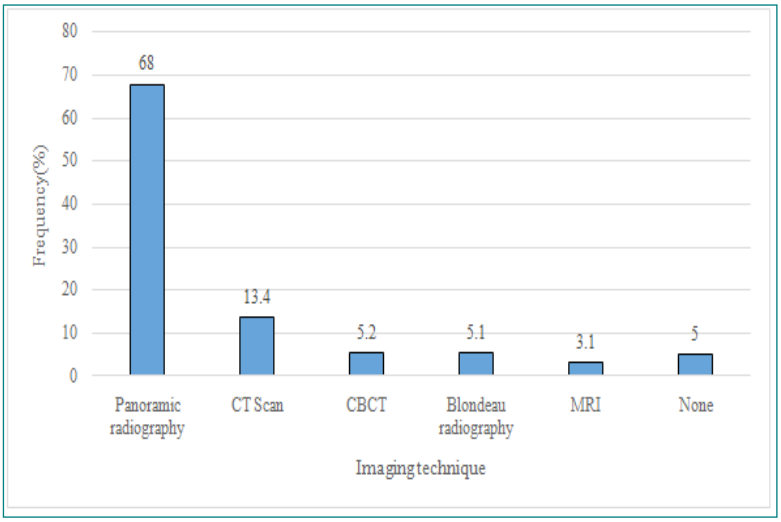

Figure 2. *Imaging modalities for OMS*

3.5 Oms Prevention Methods

Overall, 89.7% took precautions when treating posterior maxillary or antral teeth; 10.3% did not. Amongst those who took precautions, 61.9% used the Valsalva maneuver after the extraction of an antral tooth to determine oroantral communication and 10.3% requested retroalveolar radiographic findings before commencing treatment and for follow up. Amongst those who gave post-treatment counsels,89.7% counselled patients against smoking cigarettes after the extraction of antral teeth to preventsinus infection(Table 5).

Table 5. *Participants' ease of diagnosis, referral, precautions, and comfort when faced with OMS cases*

Variables Modalities		Frequency	Percentage (%)
Do you find it easy to diagnose sinusitis of dental origin	No	32	33.0
	Yes	65	67.0
In your point of view, is it necessary to still refer cases of OMS to the ENT service when you have identified the odontogenic source and treated it	No	41	42.3
	Yes	56	57.7
In your practice so far, have you treated any patient with OMS that was referred to your service by an ENT specialist	No	52	53.6
	Yes	45	46.4
Do you feel comfortable treating patients with OMS	No	25	25.8
	Yes	72	74.2
Do you take any precautions when treating sinus-related teeth in your daily practice	No	10	10.3
	Yes	87	89.7

OMS, odontogenic maxillary sinusitis; ENT, Ear-nose-throat

3.6 Overall Rating for Knowledge, Attitudes and Practices

Regarding knowledge, 54.6% of the participantshad average knowledge on OMS, 4.1% had good knowledge,33.0% had insufficient knowledge, and 13.4% had poor knowledge;33.0% of participantshad average attitudes, 4.1% had good attitudes, 33.0% had insufficient attitudes, and 29.9% had poor attitudes;and 40.2% of participantshad average practices, 29.9%reported insufficient practices, 25. 8% had poor practices, and 4.1% had good practices (Table 6).

Table 6. *Overall rating for knowledge, attitudes and practices*

Characteristic	N = 97[1](%)
Knowledge	
Average	53 (54.6%)
Good	4 (4.1%)
Insufficient	27 (27.8%)
Poor	13 (13.4%)
Attitude	
Average	32 (33.0%)
Good	4 (4.1%)
Insufficient	32 (33.0%)
Poor	29 (29.9%)
Practice	
Poor	25 (25.8%)
Insufficient	29 (29.9%)
Average	39 (40.2%)
Good	4 (4.1%)

[1] *n (%)*

4. Discussion

There is very limited data regarding OMS in Cameroon. Weassessed the knowledge, attitude, and practices of dental surgeons regardingOMS. Dental surgeons had limited or average knowledge of OMS, resulting in mediocre attitudes and practices.

4.1 Knowledge of Dental Surgeons on OMS

Here, mostparticipants agreed that diagnosis and/or treatment of OMS requires interdisciplinary collaboration. Sabiene et al. reiterated the need for a multidisciplinary approach [12]. Most who saw the need for this collaboration studied abroad andthose who did not studied in Cameroon.

Participants preferred to prescribe antibiotics or only treat the dental source of the infection. This may be due to differences in training. Most participants agreed that infection ofthe posterior antral teeth is a risk factor for OMS,similar to the findings ofOhyama et al.[14], Tian et al.[15], and Garcia et

al.[16]. Iatrogenic factors was the highest reported risk factor (96.9%), assupported by previousreports [11][7]. Participantsreported the maxillary second premolar ashaving the highest probability of causing OMS. Contrarily, Akhlaghi et al. reportedthe first, second, and third molar, and second premolar [17], which was consisted with findings ofAukštakalniset al.[7]. Most participants ranked nasal congestion as the commonest clinical sign.These findings agree with most studies [17, 18];however, dental pain is not a very frequent symptom of OMS [4]. SomeOMS cases present with very mild or no toothache [19]. Most participants reported orbital cellulitis as the commonestcomplication; 2.1% did not know any. . Daoudiet al. [20] found 85% and 15% of cases due to preseptal and retrospective cellulitis, respectively.

4.1.1 Knowledge on the Management of OMS

Antibiotherapy was the most reported treatment of choice, with amoxicillin-clavulanate being the preferred antibiotic; 4.1% didnot know how to manage OMS.This was similar to findings in previous reviews [21], implying a need for education and training on OMS management. Further, most participants reported extraction as the preferred dental procedure, as observed by Tsuzuki et al., who reported significant improvement ofsinusitis after tooth extraction[22].

4.1.2 Education and Training in OMS Management

Most participants had never received proper education or specialized training on OMS management; 87.6% of theseexpressed the desire to be trained. There was a significantassociation between the number of years in service and training. Most trainedpractitioners had been in service for at least 10years. This may be because majority of them were young dental surgeonswho had not worked for up to 10years. Furthermore, OMS cases are relatively scarce[8]. Overall, 37.1% received at least one case of OMS per month. Hoskison et al. reported that OMS cases have increased over the last decade in the United Kingdom [23].These findingsconfirm our hypothesis,suggesting that dental surgeons have limited knowledge on OMS. This may be because of limited literature on OMS[24].

4.2 Attitudes and Practices of Dental Surgeons Towards Patients with OMS

Someparticipantshad difficultiesdiagnosing sinusitis of dental origin. One challenge with diagnosing odontogenic sinusitis is that both otolaryngologists and dental providers are required. If patients present initially to otolaryngologists, clinical presentations may mimic non-odontogenic rhinosinusitis, and odontogenic sources may not be suspected. Similarly, if patients present first to dental providers with maxillary dental pathology, sinusitis may be overlooked. Further, optimal dental testing and imaging to confirm specific dental pathologies causing odontogenic sinusitis are not always performed, leading to false diagnoses. Generally, otolaryngologists should confirm sinusitis, and dental specialists should confirm odontogenic pathologies [25]. Someparticipants did not refer patients to an ENT specialist and 46.4% had treated cases of OMS referred by ENT specialists, suggestingENT specialists have a higher collaboration tendency than dental surgeons. Some participants did not feel comfortable handling OMS cases. This can be linked to the deficiency in education and training.

4.2.1 Treatment Methods Used in Daily Practice

Some participants treated the dental source first and prescribed antibiotics. Others referred patients to an ENTor treated the dental source first before referring to the ENTs, and 8.2%prescribed just antibiotics or a sinus lift surgery. Although a specific gold standard management protocol is not yet established, treatment often requires management of the sinusitis as well as the odontogenic disease of origin[26]. Psillas et al. recommendedthat treatment of dental disease alone to OMSis insufficient, and as such, concomitant sinusitis surgical treatment is necessary for full resolution[27]. However, a study found that the most common management for OMS was synchronous endoscopic sinus surgery (ESS) and dental surgery. Starkey et al. reported that 33% of patients with successfully resolved OMS underwent sinus surgery alone, suggesting that exclusive ESS could be an effective treatment approach [28]. The American Academy of Endodonticssuggests that dental treatment should be performed first, followed by ESS only if needed. However, extraction of the causative tooth of OMS is usually performed. In this study, most of the causative teeth with minimal-to-absent symptoms were preserved with antibiotics. If the burden of OMS is high, primary ESS should be recommended, followed by close dental follow-up andtreatment [26,29-30].

4.2.2 Clinical Diagnostic Methods Used in Daily Practice

Most participants used thorough dental and medical examination to diagnose OMS. Those who hurry with consultations are pruned to misdiagnosis. Accurate

diagnosis of odontogenic origin is necessary to avoid the long-term administration of inappropriate medications or unnecessary surgical management [3].

4.2.3 Paraclinical Assessment of OMS

Most participants prescribed panoramic radiographs as complementary exams for the diagnosis of OMS. However, cone-beam computerized tomography, which is unavailable in Cameroon, is the new gold standard[31, 32].

4.2.4 OMS Prevention Methods

Most participants took precautions when treating antral teeth;10.3% did not. Iatrogenic factors are thecommonest risk factors of OMS [7, 11]. Posterior maxillary teeth share a close and complex anatomical relationship with the maxillary sinuses. Failure to apply caution while working on them greatly increases the chances of developing OMS. Foreign bodies like cotton, when forgotten in a tooth socket can eventually move into the sinus and cause infection [30]. The use of gauzeis recommended to block the maxillary sinus aperture [33]. Amongst the 89.7% who took precautions when treating antral teeth, 61.9% used the Valsalva maneuver after extraction to determine oroantral communication and 10.3% requested retroalveolar radiography before treatment procedures and for follow up. When treatment is guided by retroalveolar radiography findings, costly blind decisions are minimized, increasing the chance of treatment success.Overall, 73.2% participants gave relevant counsel for the prevention of sinus infection after extraction. If good oral hygiene is not maintained after an extraction, the socket may become infected,leading to a sinus infection [34]. To prevent OMS or improve the quality of patient care, specialized trainings should be organized for dental surgeons, withspecial attention on the dental curriculum of medical faculties.

This study has some limitations. Our findings may not be generalizable as involved participants in a limited geographical area; therefore, a larger study involving several cities/towns is required to have a better reflection of the knowledge, attitudes, and practices of dental surgeons in the city.

5. Conclusion

More than half of our participants had an average knowledge on OMS, few had received specialized training on OMS management and prevention, and very few had good attitudesand good practices. This may explain why iatrogenic factors are the leading cause of OMS. Prospective studies are needed to determine the best approach to caring for this patient population.

Competing Interests

The authors declare that they have no competing interest

Authors' Contributions

All authors contributed to the writing of this article.

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5.1 Ethical Approval and Informed Consent Statement

This study was approved by the Ethics Committee of the Faculty of Medicine and Biomedical Sciences of the University of Yaounde I (Ethics Code: 0150/UYI/FMSB/VDRC/DAASR/CSD) on May12, 2023. All participants provided written informed consent prior to enrolment in the study. This research was conducted ethically in accordance with the World Medical Association Declaration of Helsinki.

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Questionnaire Adressed to Dental Surgeons

Knowledge, Attitudes and Practices of Dental Surgeons in the Management of Patients with Odontogenic Maxillary Sinusitis in the City of Yaoundé

Date : ____/____/2023 Questionnaire number: _____ ONCDC number : _____

Please circle the correct answer(s)

Section 1.

Socio-Demographic Information.

1. Age (year): □ 20-40 □ 41-64 □ 65+

2. Gender: □ Male □ Female

3. Number of years in service: □ 1-5 □ 5-10 □ 10-15 □ 15-20 □ 20-25 □ 25-30

□ 30-35

4. Type of working place: □ Private □ Public

5. Domain of specialization:

□ General Dentistry

□ Pediatric Dentistry

□ Periodontology

□ Maxillofacial Surgery

□ Prosthetic Dentistry

□ Orthodontics

□ Endodontics

□ Others (specify):_____

6. Dental School:

□ FMBS Yaoundé □ UDM Bangangté

□ Others (specify):_____

Section 2.

Knowledge on Odontogenic Maxillary Sinusitis.

7. Odontogenic maxillary sinusitis is a symptomatic inflammation of the maxillary sinus as a result of a dental pathology or dental procedures:

□ Yes

□ No

□ I do not know

8. The diagnosis of odontogenic maxillary sinusitis requires multidisciplinary collaboration between otolaryngologists and dental providers:

□ Yes

□ No

□ I do not know

9. On risk factors for odontogenic maxillary sinusitis:

a) Infection of posterior maxillary teeth is a possible risk factor for odontogenic maxillary sinusitis: □ Yes □ No

b) Infection of anterior maxillary teeth is a possible risk factor for odontogenic maxillary sinusitis: □ Yes □ No

c) Iatrogenic factors such as dental implants and complications of dental extractions constitute risk factors for odontogenic maxillary sinusitis: □ Yes □ No

d) Infection of anterior mandibular teeth is a high risk for odontogenic maxillary sinusitis: □ Yes □ No

e) Infection of posterior mandibular teeth is a high risk for odontogenic maxillary sinusitis: □ Yes □No

10 The following can lead to OMS:

a) Oroantral fistulas: □ Yes □ No

b) Implant displacement into the sinus: □ Yes □ No

c) Migration of a tooth or root during dental extraction: □ Yes □ No

d) Endodontic treatment poorly done: □ Yes □No

e) Dental caries: □ Yes □ No

f) Periapical infection: □ Yes □ No

g) Periodontal disease: □ Yes □ No

h) Odontogenic cysts: □Yes □ No

11. Which of this tooth has the highest probability of causing OMS?

□ Maxillary first premolar

□ Maxillary second premolar

□ Maxillary first molar

□ Maxillary second molar

□ Maxillary third molar

□ Maxillary canine

□ None

12. Select the clinical signs of OMS:

a) Facial pain: □ Yes □ No

b) Foul odor: □ Yes □ No

c) Nasal congestion: □ Yes □ No

d) Purulent anterior rhinorrhea: □ Yes □ No

e) Tooth pain: □ Yes □ No

f) Postnasal dripping: □ Yes □ No

13. What are the possible complications of OMS:

a) Orbital cellulitis: □ Yes □ No

b) Cerebral abscesses: □ Yes □ No

c) Cavernous sinus thrombosis: □ Yes □ No

d) Meningitis: □ Yes □ No

e) None: □ Yes □ No

Knowledge on the management or treatment of patients with OMS in daily practice.

14.What are various treatment proposals for OMS:

a) Treatment of the dental infection: □ Yes □ No

b) Antibiotherapy: □ Yes □ No

c) Endoscopic Sinus Surgery: □ Yes □ No

d) Caldwell Luc Procedure: □ Yes □ No

e) None: □ Yes □ No

15. Which of these antibiotics will you recommend most for a case of OMS? □ Amoxicillin-clavulanate □ Doxycycline □ Ciprofloxacin □ Others (specify):_____

16. Which of these dental procedures can help in the management of OMS?

a) Extraction: □ Yes □ No

b) Endodontic treatment: □ Yes □ No

c) Apicoectomy: □ Yes □ No

Education and training in OMS management

17. Since you started working, have you undergone any special training in the management of OMS? □ Yes □ No

18. If yes, which type of training? □ Medical □Surgical □ Radiological

□ Others (specify):_____

19. If no, do you think you need the training? □ Yes □ No

Section 3.

Attitudes and Practices Towards Patients with OMS.

20. What are some of the barriers you have encountered as regards the treatment of OMS:

□ Inability to diagnose the disease

□ No proper education in the domain

□ Do not feel confident

□ Do not feel safe

□ No interest

□ Others (specify):_____

21. What is the average number of OMS cases you receive per month?

□ None □1 □2 □ 3 q More than 3

22. Do you find it easy to diagnose sinusitis of dental origin in your daily practice?

□Yes □ No

23. In your point of view, is it necessary to still refer cases of OMS to the ENT service when you have identified the odontogenic source and treated it? □ Yes □ No

24. Do you feel comfortable treating patients with OMS? □ Yes □ No

25. In your daily practice, do you take any precautions when treating posterior maxillary teeth or sinus-related teeth? □ Yes □ No

26. If yes, which precaution(s)?

a) Post-treatment counsels: □ Yes □ No

b) I pay careful attention to the correct administration of the treatment in view because of the risks involved: □ Yes □ No

c) I know the Valsalva maneuver and I use it after the extraction of antral teeth to determine if there is oro-antral communication: □ Yes □ No

d) I use retroalveolar X-rays before commencing treatment procedures on antral teeth and for follow up: □ Yes □ No

27.You just did a successful extraction of tooth number 16; which counsel(s) will you give your patient as preventive measures against sinus infection after the extraction?

a) Avoid the use of straws: □ Yes □ No

b) Rinse two times a day with a mouthwash: □ Yes □ No

c) Continue to brush your teeth, but gently, especially near the surgical area:

□ Yes □ No

d) Do not smoke cigarettes: □ Yes □ No

e) Use decongestant medications: □ Yes □ No

f) None: □ Yes □ No

28. Which clinical method(s) do you usually use in this situation?

a) Experimenting using common sense: □ Yes □ No

b) Active listening (interviewing): □ Yes □ No

c) Thorough dental and medical/clinical examination: □ Yes □ No

d) Comprehensive history taking: □ Yes □ No

e) Others (specify):_____

29. Which imaging technique do you prescribe more frequently when you

suspect OMS? □ Panoramic radiography □ CT scan □ CBCT □ MRI

□ Others (specify):_____

30. In your daily practice, which of these treatment methods have you used?

□ Dental treatment and antibiotherapy

□ Referred to ENT specialist

□ Dental treatment and referred to ENT specialist

□ Others (specify):_____

31. In your practice so far, have you treated any patient with OMS that was referred to your service by an ENT specialist? □ Yes □ No