Vol. 8(2), pp. 21-26, July-December, 2021
DOI: 10.5897/AJOHS2021.0012
Article Number: 598B07068430
ISSN: 1608-7232

http://www.academicjournals.org/AJOHS

ACADEMIC JOURNALS
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African Journal of Oral Health Sciences

Full Length Research Paper

Risk factors and complications associated with dental extraction treatment in the Western Region of Cameroon: A cross sectional study

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Received 19 August, 2021; Accepted 24 November, 2021

Complications associated to dental extraction remain a concern and can be a source of morbidity. However, adequate management could avoid these complications. The purpose of this study was to assess the risks factors and complications associated with dental extraction in the Western Region of Cameroon. This was a cross sectional study carried out between January 25 to April 30, 2019. Patients 15 years and above were recruited by convenience sampling. Included in the study were patients who had tooth extraction and managed for post-extraction complications. . A total of 1500 patients were consulted and 170 patients presented with post-extraction complications giving a frequency of 11.34 %.The main reasons for consultation was toothache 146(85.88 %), (54%) of the patients who presented with complications were males. Dental extractions were performed by dental therapists 91(53.53%), dental students on training 49(28.82%) and dental surgeons 30(17.65%).Post-extraction complications were hemorrhages 54(27%), suppurative alveolitis 53(26.23%), dry socket 23(11.56%), post-extraction pain 20(10%) and postoperative edema 20(10%). Multivariate analysis revealed that the factors associated with the hemorrhage were the maxillary arch extraction (OR 3.18, 95% CI 1.6-8.5, p= 0.04), extraction performed by dental students on training (OR 1.40, 95% CI 1.1-4.37, p= 0.028) and tobacco use (OR 1.8, 95% CI 1.01- 3.99, p= 0.012). Dry socket was associated to mandibular extraction (OR 4.22, 95% CI 2.19- 8.1, p= 0.000) and those associated with inflammation were female (OR 2.15, 95% CI 1.11-4.18, p= 0.017) and extraction of 4 teeth (OR 6.17, 95% CI 1.15-32.93, p= 0.029). Dental extractions were performed mainly by dental therapists and complications after tooth extraction were significantly associated with extractions performed by dental students on training.

Key words: Tooth extraction, Complications, Hemorrhage, Alveolitis, epidemiology, therapy, Cameroon.

INTRODUCTION

Tooth extraction is a procedure of removing the tooth from its socket. The technique can be simple (respecting the integrity of soft and hard tissues) or surgical (requiring a mucoperiosteal flap and destruction of mucous, bone, /or dental obstacles) (Narendar et al., 2017). Tooth extraction is one of the most affordable and simple dental

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procedures carried out in a dental clinic that is why in developing countries, 12.30 to 33.40% of dental extractions are recorded in daily practice (Guiguimde et al., 2014; Agbor et al., 2011).

Performing tooth extraction requires compliance with a number of rules inherent in all surgical practices. But, despite a perfect knowledge of the patient and mastery of the operative procedure, these procedures can lead to complications which might be difficult to predict and which can occur during or after the intervention (Narendar et al., 2017; Guiguimde et al., 2014).

Miclotte et al. (2018) reported that the 3 most common post extraction complications were wound infection (2%), pain without apparent cause (<1%), and oroantral communication (<1%). They also reported that patients who had their 3rd Molars extracted were at increased risk of complications compared with those who had simple tooth extractions (Odds ratio (OR) 1.5, p=0.024), particularly for infection (OR 5.9, p<0.001) and hypoaesthesia (OR 8.4, p=0.027) (Agbor et al., 2011). Most often, hemorrhage, fractured tuberosity especially in the upper third molars and retained roots are some common complications for simple extractions. Miclotte et al. (2018) also highlighted that half of all patients with these complications are treated with oral antibiotics (Agbor et al., 2011). Peri-orbital abscess, injury to adjacent tooth and inferior alveolar nerve paresthesia are also common in tooth extractions (Miclotte et al., 2018; Baniwal et al., 2007).

Complications after tooth extraction remain a concern and can be a source of morbidity and even mortality. However, timely management could avoid these complications. The purpose of this study was to assess the risk factors and complications of post extractions complications following dental extraction in Western region of Cameroon.

METHODS

A descriptive analytical cross sectional study was carried out in 14 dental Clinics (made up of 09 public and 05 private dental clinics) in the Western Region of Cameroon between January and April 2019. Selected in the study were patients with permanent dentition who had one or more dental extractions and returned a few days with postoperative complications. Several patient came for extractions and having pre- and intraoperative complications, patient having no complaints after tooth extraction, those under 15 years old, any patient having post-extraction complications that appeared after more mechanical complications).

The type of oral health care provider involved in dental extractions was also noted in the data sheet (dental surgeon, dental therapists or dental students on training). Data analysis was performed using SPSS Version 21.0 software. Chi-square test was used and the significance level was fixed at p <0.05. Univariate and multivariate analysis was performed to look for risk factors associated with complications.

Ethical considerations

Authorization to carry out this research was taken from the University of the Mountains, institutional review and research ethics board and from the other hospitals which allowed the studies to take place in their institutions. All participants of the study gave the consent.

RESULTS

Out of 1,500 patients received for tooth extraction during the study period, 170 (11.34%) developed post-extraction complication. The study population was made up of 91 men and 79 women with a sex ratio of 1.15. The mean age was 34.19 ± 14.9 years with extremes of 15 and 89 years. Dental extractions was performed by dental therapists 91(53.5%), dental students on training 49(28.8%) and dental surgeons 30(17.6%).

The main consultation complaint was toothache 146(85.88 %). The majority 156(91.76 %) had poor oral hygiene condition (Table 1). The most frequent comorbidities was gastritis (50.74%) (Table 2).

Extractions were more in the mandible 91(53.5%) than the maxilla and the majority of the extractions were simple extractions 144(84.7%). The main post-extraction complications were hemorrhage 54(27.14%), suppurative alveolitis 53(26.23%) and dry socket 23(11.56%) (Table 3). Table 4 show the distribution of various post-extraction complications.

54 cases of post-extractive hemorrhage encountered in the present study, 43 (79.63%) were in the maxilla and 11 (20.37%) in the mandible. Of 23 cases of dry socket, 15 (65.22%) were in the mandible. Among the 53 cases of suppurative alveolitis, there were 40 (75.47%) in the mandible and 13 (24.53%) in the maxilla.

Regarding hemorrhages, the authors found that tobacco consumption, tooth extraction in the maxilla and procedure performed by a dental students on training were associated with hemorrhage (Table 5). Regarding alveolitis, it appears that the associated factor was tooth extraction from the mandible (Table 6). Risk factors associated with inflammation were: being female, and the extraction of 4 teeth (Table 7). Table 8 shows the risk factors for post extraction complications.

DISCUSSION

The current study showed that post extractions complications were frequent and occurred in 1 out of 10 patients. Risks factors for these complications included the type of clinician involved, the site of extractions, and the number of teeth extracted and the use of tobacco. Dental extractions were performed mainly by dental therapists and complications after tooth extraction are significantly associated with extractions performed by dental students on training.

The mean age in the current study was 34.19 years old which is similar to that of Miclotte et al. (2018). This mean age could be justified by the frequent dental eruption disorders at this age added to the high prevalence of

Table 1. Distribution of patients according to their reasons for consultation and level of hygiene.

Variable	Frequency (N)	Percent
Reasons for consultation		
Toothache	146	85.88
Dental dysfunction	16	9.41
Prosthetic	8	4.71
Total	170	100.00
Oral hygiene status		
Bad	61	35.88
Average	95	55.88
Good	14	84

Table 2. Distribution of different comorbidities encountered.

Comorbidities	Frequency (N)	Percent
No	103	60.9
Yes	67	39.4
Total	170	100
Pathologies		
Diabetes	17	25.38
Hypertension	15	22.38
Gastritis	34	50.74

Table 3. Distribution of dental extractions according to the sites and the type of extractions.

Variable	Frequency (N)	Percent
Site of extraction		
Maxilla	79	46.47
Mandibule	91	53.53
Type of extractions		
Simple	144	84.71
Surgical	26	15.29
Complications		
Hemorrhage	54	27.14
Suppurative alveolitis	53	26.63
Dry socket	23	11.56
Cellulitis	6	3.01
Traumatic	23	11.56
Edema	20	10.05

dental caries and its complications in Africa (Banjwal et al. 2007). Also the slight predominance of males in the current study could be explained by the fact that men are more exposed to risk factors as reported by Agbor et al. (2011) who obtained similar results and explained that the male predominance in their study was due to poor oral hygiene, smoking, and alcoholism.

According to Agbor et al. (2018a) in Cameroon, the management of dental diseases should be carried by dental surgeons. Dental therapists should provide care

Table 4. Distribution of the various post-extraction complications.

Complication	Frequency (N)	Percent
Hemorrhage	54	27.14
Suppurative alveolitis	53	26.63
Dry socket	23	11.56
Cellulitis	6	3.01
Traumatic	23	11.56
Edema	20	10.05

Table 5. Risk factors associated with postoperative hemorrhages.

Variable	Hemorrhage		OR (IC 95%)	P value
	Yes	No		
Extraction site				
Maxilla	44 (81.5)	35 (30.2)	10.18 (4.60-22.5)	0.000
Mandible	10 (18.5)	81 (69.8)	0.09 (0.04-0.22)	0.000
Profile of practitioners				
Dental therapist	31 (57.4)	60 (51.7)	1.26 (0.65-2.41)	0.299
Dental students on training	11 (20.4)	19 (16.4)	1.31 (1.07-2.97)	0.032
Dentist surgeon	12 (22.2)	37 (31.9)	0.58 (0.28-1.23)	0.105
Tobacco				
Oui	21 (38.9)	28 (24.1)	2.00 (1.01-3.99)	0.038
Non	33 (61.1)	88 (75.9)	0.5 (0.25-0.99)	0.038

Table 6. Risk factors associated with alveolitis.

Variable	Alveolitis		OR(IC 95%)	P value
	Yes	No		
Profile practitioner				
Dental therapist	38 (50.0)	53 (56.4)	0.77 (0.42-1.42)	0.249
Dental students on training	14 (18.4)	16 (17.0)	1.10 (0.49-2.43)	0.484
Dentist surgeon	24 (31.6)	25 (26.6)	1.27 (0.65-2.48)	0.293
Extraction site				
Maxillary	21 (27.6)	58 (61.7)	0.24 (0.12-0.45)	0.000
Mandibule	55 (72.4)	36 (38.3)	4.22 (2.19-8.10)	0.000
Tobacco				
Yes	25 (32.9)	24 (25.5)	1.43 (0.74-2.78)	0.188
No	51 (67.1)	70 (74.5)	0.70 (0.36-1.36)	0.188

on dental surgeon's supervision. In the present study, dental therapists were twice more involved in the delivery of oral health care than dental surgeons. A similarity has been reported by the WHO (8) which states that in Africa, the number of dentists per capita is around 1 in 150,000 compared to 1 in 2000 in most industrialized countries. In Cameroon, Agbor et al. (2018a) in their study showed that the number of dentists in the country also remains insufficient to cover the needs. They suggested that mid-level oral health care providers like dental therapists can act as a substitute for a dentists surgeons, especially in areas of the country where the concentration of dentists

Table 7. Risk factors associated with inflammation.

Variable	Inflammations		OR (IC 95%)	P-value
	Yes	No		
Sex				
Male	21 (40.4)	70 (59.3)	0.46 (0.24-0.90)	0.017
Female	31 (59.6)	48 (40.7)	2.15 (1.11-4.18)	0.017
Profile of the practitioner				
Dental therapists	26 (50.0)	65 (55.1)	0.81 (0.42-1.57)	0.328
Dental students on training s	10 (19.2)	20 (16.9)	1.17 (0.50-2.70)	0.437
Dentist surgeon	16 (30.8)	33 (28.0)	1.14 (0.56-2.34)	0.412
Number of teeth extracted				
One	42 (80.8)	112 (94.9)	0.23 (0.07-0.66)	0.005
Two	2 (3.8)	3 (2.5)	1.53 (0.25-9.46)	0.4852
Three	3 (5.80)	1 (0.8)	7.16 (0.73-70.57)	0.085
Four	5 (9.6)	2 (1.7)	6.17 (1.15-32.93)	0.029

Table 8. Risk factors for post-extraction complications (multivariate analysis).

Risk factor	OR (IC 95%)	P-value
Hemorrhage		
Maxillary extraction	3.18 (1.60-8.5)	0.040
Dental students on training	1.40 (1.10-4.37)	0.028
Tobacco	1.80 (1.01-3.99)	0.012
Alveolitis		
Mandibular extraction	3.54 (1.11-7.13)	0.015
Inflammations		
Female	1.4 (1.35-4.02)	0.031
Four tooth extraction	3.68 (1.31-10.12)	0.029

are low or where the prevalence of dental diseases are very high.

Most of the patients identified in the study population consulted for pain reasons. These results are closely to the one reported by Agbor et al. (2018b) and Achembong et al. (2012) who showed that pain is the first reason for consultation in the stomatology department in Cameroon.

One of the main causes of post-extraction complication is poor oral hygiene. The results of this study showed that oral hygiene is average and poor in 56 and 36% of our study population respectively. This is one of the reasons why prophylactic antibiotic coverage is essential in an environment where oral hygiene is poor.

Patients at risk of infection or haemorrhage represented a minority of the study population but not negligible part of our sample seen in the dental clinic. Therefore, details clinical evaluations must be carried out at the first consultation, before any procedure is performed, in order to rule out any possible risks of complications .Among the most common infectious post-extraction complications was dry socket. In our study, dry socket was characterized by a throbbing, intense pain caused by exposure of the bone at the extraction site so the edges are grayish, tender and foul-smelling.

Akpata et al. (2013) conducted a one-year prospective study in Nigeria with 76 consenting patients who came for a one-week post-extraction exam. Their study revealed that poor oral hygiene, poor asepsis and poor adherence to post-extraction counseling were the main causes of dry socket Akpata et al. (2013). Oginni (2005) as in the current study reported that the majority of extracted teeth were on the mandible. This could be explained by the high frequency of eruption disorders of the mandibular wisdom teeth due to the bone obstacles encountered at this level and, the dental eruption being earlier in the mandible. Three-quarters of the patients in the present

study presented with dry socket in the mandible. Souaga et al. (2009) states that the frequency of alveolitis is higher in the mandible than in the maxilla because of the vascularization of the mandible which is less compared to that of the maxilla Souaga et al. (2009). In the present study, one third of the patients presented with post-extractive hemorrhages. Narenda et al. (2017) in his study reported 10.66% of postoperative hemorrhage. This difference could be explained by the fact that our study was done in West Cameroon region where there are fewer dental surgeons than in Yaounde where he did his study. In most cases, these post-extraction hemorrhages are noted in the maxilla and can be justified by the large vascular network that exists at that level.

The study also showed that there was a strong association between post-extraction complications and clinical experience in terms of duration of practice and also with smoking. This could be explained by the lack of mastery of extraction techniques by the dental students on training and by the toxic action of smoking, particularly nicotine, which would disturb hemostasis (Renaud et al., 1984). Tooth extraction from the mandible was a factor associated with post-extraction alveolitis due to the fact that mandibular wisdom teeth were the most extracted and because of potential dental eruption disorders at this level.

Conclusion

The frequency of tooth extraction was 11.33% and it was more common in males and predominant in young adults. The main reason for tooth extractions was dental pain and majority of extractions were from the mandible. Dry socket and hemorrhage were the most common post-extraction complications. The majority of dental extractions were performed by dental therapists. Factors associated with these complications included extraction sites, number of teeth extracted, poor oral hygiene, tobacco, and the level of practitioners' experience.

CONFLICT OF INTERESTS

The authors have not declared any conflicts of interests.

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