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Dental and Periodontal Diseases Among United Nations Personnel in Mission: A Fifteen Months Experience of Rwanda Level 2 Hospital Bria in Central African Republic

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Abstract: Oral diseases and orodental trauma are major public health problems worldwide and poor oral health has a profound effect on general health and quality of life. This retrospective study was conducted on dental visits at Rwandan Level 2 hospital Bria in Central African Republic from August 2015 to November 2016. Dental and periodontal diseases have been documented; demographic and analytical data were reviewed and analyzed. A total of 540 dental visits aged from 22 to 59 years; mean age of 37.57 ± 8.15 years. Male sex ratio of 9.6: 1. Dental caries, gingivitis and periodontitis were more prevalent with 33.13%, 16.98% and 13.87% respectively. Scaling and root planning, permanent filling and extractions were the most treatment in 34%, 32.4% and 19.92% respectively. The teeth 16, 26, 36 and 46 were found to be more diseased with 23%, 25.52%, 30.17% and 27.15% respectively. Gingivitis and periodontitis showed a protection association with age of less than 37.57 years p=0.013, OR=0.55, 95% CI (0.34 - 0.88) and p< 0.001, OR=0.38, 95% CI (0.22 – 0.64) respectively. Dental caries, Operculitis, fractured crown and teeth extractions showed strong statistical significance and risks with particular teeth. Dental and periodontal diseases are prevalent at Rwanda Level 2 hospital Bria. The different diseases and management have been documented. As per our hypothesis, dental caries were found to be the most common disease in this population. Particular statistical association of some diseased teeth has been shown.

Keywords: Dental, Periodontal, Disease, Rwanda Level 2 Hospital

1. Introduction

Chronic diseases and injuries are the leading health problems in all but a few parts of the world. Oral diseases qualify as major public health problems owing to their high prevalence and incidence in all regions of the world, as for all diseases, the greatest burden of oral diseases is on disadvantaged and socially marginalized populations [1, 2]. The quality of life of workers is an issue that deserves attention, since the promotion of welfare benefits, such as medical and dental care to employees, are extremely efficient means and can be used by businesses in order to improve inter business competitiveness, in a globalized world [3].

The Security Council established the United Nations Multidimensional Integrated Stabilization Mission in the Central African Republic (MINUSCA) by its resolution 2149 (2104) on 10 April 2014 [4]. Rwanda Level 2 hospital is the

UN hospital, which serves UN personnel based in Eastern headquarter. It is staffed with surgeons, anesthetists, gynecologist, internist physician, general practitioners, nurses and dental therapeutists.

The objective was to determine the burden of oral diseases in the zone covered by Rwanda Level 2 hospital Bria in Central African Republic.
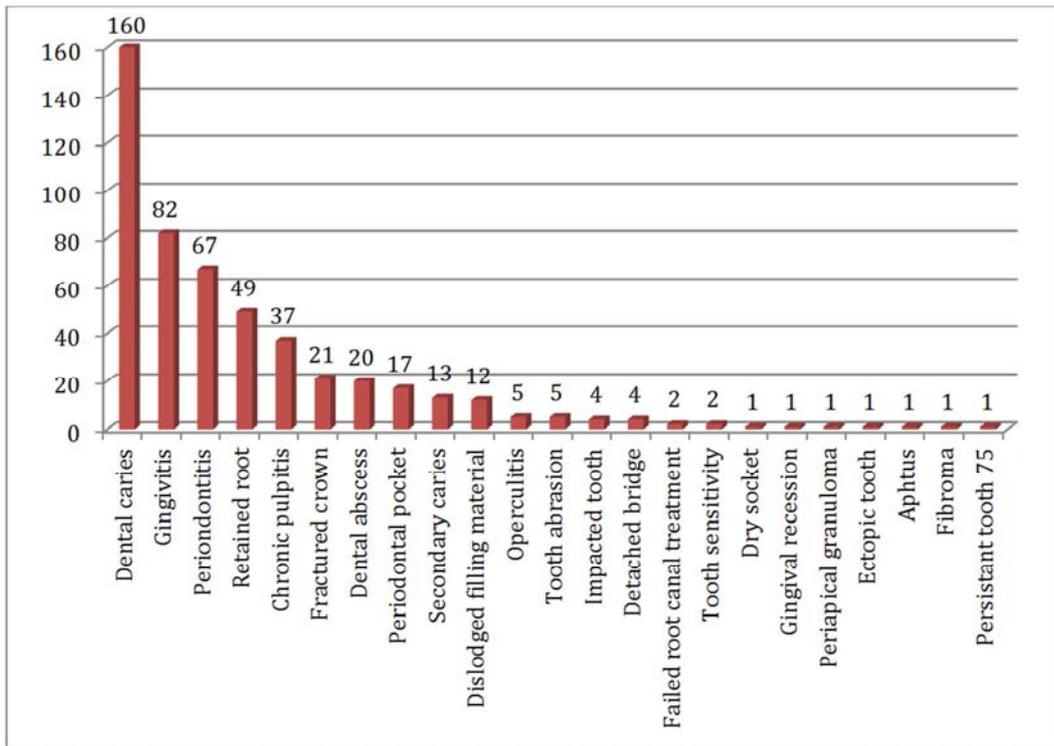
Figure 1. Dental and periodontal diagnoses.

2. Materials and Methods

This was a retrospective descriptive of data and records of patients who visited dental unit at UN Rwanda Level 2 hospital over a fifteen months period from August 2015 to November 2016. Were included all completed files for patients who consulted for dental and periodontal diseases. Proposal was submitted and approved by Rwanda Level 2 hospital ethical committee. Data were entered in the computer programme Statistical Package for the Social Sciences (SPSS) software version 16.0 and analyzed both with the aid of the computer programme SPSS and Microsoft Excel.
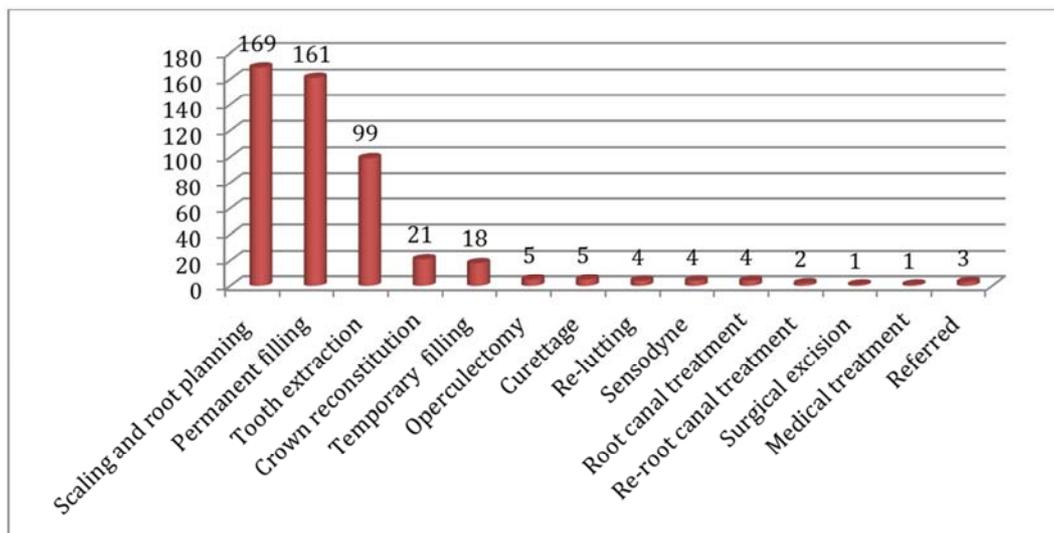
Figure 2. Management received.

Descriptive statistics were used for frequencies, mean and analytical statistics were used for cross tabulations, 95% confidence intervals applied as necessary.

The statistical test Pearson's Chi-square was computed only for 2x2 tables with cells which had expected count more than 5 and those having expected count less than 5, Fisher's Exact Test was used and the limit of significance was established at the probability less to 0.05 (P< 0.05).

3. Results and Discussion

3.1. Results

316 patients' files were reviewed and a total of 540 dental visits met our inclusion criteria with a prevalence rate of 17.97%. Males were predominant with 90.56% (sex ratio of 9.6: 1). The mean age was 37.57± 8.15 years, median of 36 years and mode being 35. Contingent elements presented 69.26% of visits.

507 dental and periodontal diagnoses have been reviewed and managed and 33 visits were for follow up only without new diagnosis or added treatment.

3.1.1. Distribution According to Dental and Periodontal Diagnoses

Dental caries took the lead with 31.56%, gingivitis with 16.17%, periodontitis 13.21%, retained root (root caries) 9.66%, chronic pulpitis 7.29%, fractured crown 4.14% and dental abscess with 3.94%.

3.1.2. Distribution According to Management Received

497 dental and periodontal diseases have been reviewed and managed and 10 visits had diagnosis and needed x-rays for confirmation and after went back to their respective level 1 for management.

As mentioned above in the figure 2, Scaling and root planning, permanent filling and tooth extraction were in 86.32% the principal treatments given; crown reconstitution represented 4.22%, temporary filling was the only treatment received for 3.62% found in the files (patients did not come back, rotations induced, etc.), one patient received medical treatment (for aphtus).

3.1.3. Distribution According to Dental and Periodontal Diseases
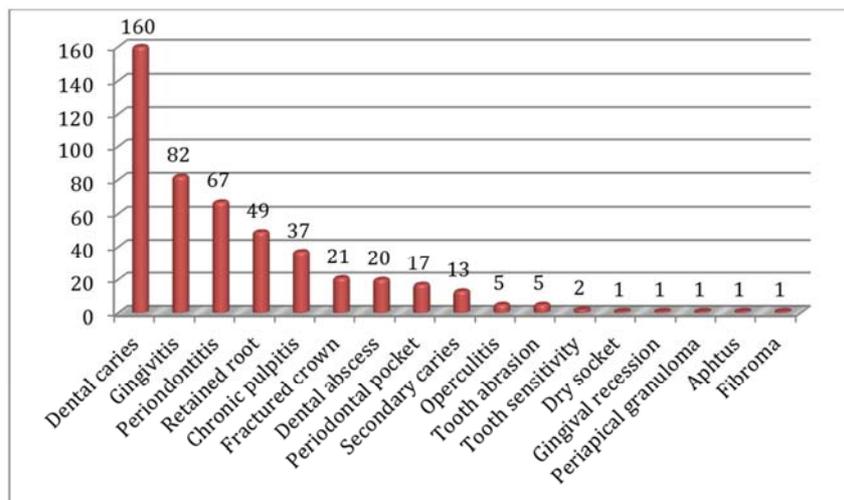


Figure 3. Dental and periodontal diseases.
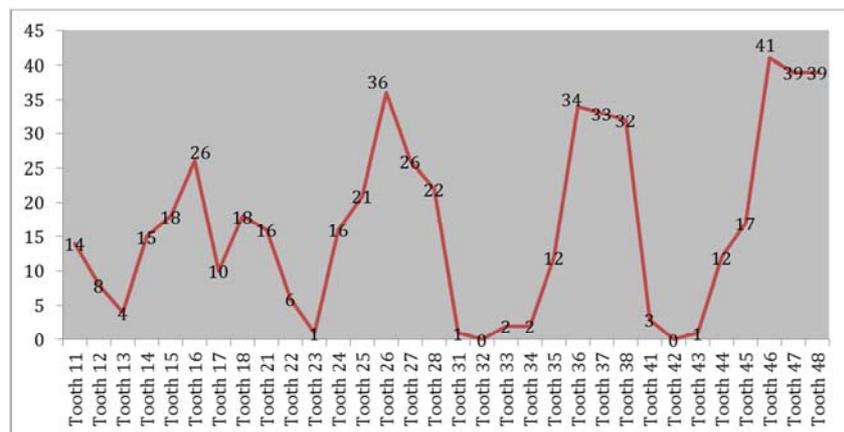
Figure 4. Frequency of diseased teeth review.

As shown above, 483 diseases have treated. Dental caries took a leading prevalence of all dental and periodontal diseases visits with 160/483 (33.13%) followed by gingivitis with 16.98%, periodontitis with 13.87%, teeth retained root at visit was 10.14%, chronic pulpitis with 7.66%, fractured crown with 4.35%, dental abscess with 4.14%.

Dental diseases were more frequent (298=61.7%) than periodontal diseases (185=38.3%).

3.1.4. Distribution According to the Frequency of Diseased Teeth Review

525 teeth were reviewed. The tooth 16 was more diseased in the first quadrant with 23%, 26 being in the most in second quadrant with 25%, 36 being the most in the third quadrant with 29.31% and 46 being the most in the fourth quadrant with 26.98%.

Noted that the teeth 32 and 42 did not show any dental pathology during this cohort.

The teeth diseases distribution in quadrants (Q) were respectively: 21.52% (Q1), 27.43% (Q2), 22,1% (Q3) and 28.95% (Q4).

The teeth from Q1 and Q4 were affected (50.47%) than Q2 and Q3 (49.53%). And teeth from the maxillary jaw were less affected (49.95%) than those from the mandibular jaw (51.05%).

3.1.5. Distribution According to Periodontal Diseases and Age

Table 1. *Periodontal diseases and AgePatients less to 37.57 years old were protected to develop periodontal diseases than olders, OR of 0.55 and 0.38 respectively.*

		Age	(Years)	P value	OR (95% CI)
		< 37.57	> 37.57		
Gingivitis	Yes	35	47	0.013	0.55 (0.34-0.88)
	No	263	196		
Periodontitis	Yes	23	44	< 0.001	0.38 (0.22-0.64)
	No	275	198		

3.1.6. Caries Distribution According to the Most Probable Affected Teeth

Table 2. *Most probable affected teeth by Caries.*

		Tooth 14		P value	OR (95% CI)
		Yes	No		
	Yes	9	151	0.009	3.71 (1.3-10.61)
	Non	6	374		
		Tooth 15			
		Yes	No		
	Yes	10	150	0.014	3.1(1.2-8)
	Non	8	372		
		Tooth 21			
		Yes	No		
	Yes	9	151	0.018	3.18 (1.16-8.68)
	Non	7	373		
		Tooth 22			
		Yes	No		
Dental caries	Yes	5	155	0.01	12.22 (1.42-105.5)
	Non	1	379		
		Tooth 26			
		Yes	No		
	Yes	22	138	<0.001	3.88 (1.95-7.69)
	Non	15	365		
		Tooth 44			
		Yes	No		
	Yes	10	150	<0.001	12.6 (2.73-58.19)
	Non	2	378		
		Tooth 46			
		Yes	No		
	Yes	22	138	<0.001	3 (1.59-5.77)
	Non	19	361		
		Tooth 47			
		Yes	No		
	Yes	21	139	0.001	3 (1.57-5.87)
	Non	18	362		

Dental caries were associated with tooth 14 (p= 0.009, OR= 3.71 (1.3-10.61)); 15 (p=0.014, OR=3.1 (1.2-8)); 21 (p=0.018, OR=3.18 (1.16-8.68)); 22 (p=0.01, OR=12.22 (1.42-105.5)); 26 (p<0.001, OR=3.88 (1.96-7.69)); 44 (p<0.001, OR=12.6(2.73-58.19)); 46 (p<0.001, OR=3 (1.59-5.77)) and 47 (p=0.001, OR=3 (1.57-5.87).

3.1.7. Distribution According to Other Dental Diseases and Teeth

Table 3. *Other Caries diseases teeth.*

		Tooth 38		P value	OR (95% CI)
		Yes	No		
	Yes	2	3	0.03	11.2 (1.8-69.73)
	No	30	505		
Operculitis		Tooth 48			
		Yes	No		
	Yes	3	2	0.003	20.8 (3.4-128.4)
	No	36	499		
		Tooth 45			
		Yes	No		
Fractured crown	Yes	3	18	0.024	6 (1.6- 22.8)
	No	14	505		
		Tooth 38			
		Yes	No		
Chronic pulpitis	Yes	7	30	<0.001	4.6 (1.8- 11.7)
	No	24	479		
		Tooth 24			
		Yes	No		
	Yes	6	42	<0.001	6.8 (2.4- 19.8)
	No	10	482		
Retained root		Tooth 25			
		Yes	No		
	Yes	6	42	0.001	4.5 (1.7 - 12.3)
	No	15	477		
		Tooth 16			
		Yes	No		
	Yes	5	8	<0.001	15 (4.5-49.9)
	No	21	506		
Secondary caries		Tooth 33			
		Yes	No		
	Yes	1	12	0.048	43.8 (2.6-742.9)
	No	1	526		

Operculitis showed a strong association with tooth 48 p=0.003, OR=20.8 95% CI (3.4-128.4) than 38 p=0.03,

OR=11.2 95% CI (1.8-69.73).

Fractured crown showed an association with tooth 45 p=0.024, OR=6, 95% CI (1.6-22.8). Retained root showed a strong association with teeth 24 and 25 p<0.001, OR=6.8, 95% CI (2.4-19.8) and p=0.001, OR= 4.5, 95% CI (1.7-12.3) respectively.

The teeth 16 and 33 showed a significance association of developing secondary caries (p= 0.001 and 0.048) with relative risks of 15 and 43.8 times.

3.1.8. Distribution According to the Tooth Risk for Extraction

Table 4. Tooth risk for extraction.

		Tooth 18		P value	OR (95% CI)
		Yes	No		
	Yes	7	92	0.022	2.9 (1.12-7.8)
	No	11	430		
		Tooth 24			
		Yes	No		
	Yes	7	92	0.008	3.6 (1.3-10)
	No	9	432		
		Tooth 36			
		Yes	No		
Extraction	Yes	11	88	0.038	2.2 (1-4.6)
	No	24	417		
		Tooth 37			
		Yes	No		
	Yes	12	87	0.006	2.7 (1.3-5.8)
	No	21	420		
		Tooth 38			
		Yes	No		
	Yes	12	87	0.003	3 (1.4 - 6.5)
	No	19	422		
		Tooth 48			
		Yes	No		
	Yes	13	86	0.009	2.5 (1.2-5.1)
	No	25	416		

Tooth extraction showed a strong association with tooth 18 (p= 0.022, OR= 2.9 (1.12-7.8)); 24 (p=0.008, OR=3.6 (1.3-10)); 36 (p=0.038, OR=2.2 (1-4.6)); 37 (p=0.006, OR=2.7 (1.3-5.8)); 38 (p=0.003, OR=3(1.4-7.6.5)) and 48 (p=0.009, OR=2.5 (1.2-5.1)).

3.2. Discussion

Dental and periodontal diseases are prevalent at Rwanda Level 2 hospital Bria in Central African Republic with 17.97%. These results are similar to those reported in [3], showed that among the most serious problem in the population of UNTAG peacekeepers, dental problems counted 13.1%.

The prevalence could be reduced to 7.67% if a preemployment exams was done and exclude those with dental problems as found in the study done by Thaís Richter de Araújo et al. (2013), for preemployment exams, 10.24% (720) of the candidates, from a total of 7,029, were excluded for dental reasons to reduce absenteeism in the workplace [5].

This study found a male sex ratio of 9.6: 1 where men represented 90.56%. Barbara E et al. (2011-2012), Muhammad I et al. (2014-2015), Fabien Sauvet et al. (2006)

found the same distribution 84%, 88.6%, 97.39% respectively [6, 7, 8].

From data of systematic review and oral-systemic research expands to include genetics and immunity in general, authors found the same distribution like our research where males' sex was prevalent: Shiau HJ et al. (2010) a systematic review of the literature and meta-analyses in sex differences in destructive periodontal disease estimates sex-related differences in the prevalence of periodontitis in men 37.4% versus 28.1%, respectively [9]. Dan Sindelar, DMD (2015) found that men are at greater risk for developing destructive periodontal disease than women due to heightened innate immune response in men compared to women [10].

Patients' age was between 22 and 59 years old with a mean of 37.57 ± 8.15. These results are similar to results found by Muhammad I et al. (2016) in Darfur, where the age ranged from 20-60 years with a mean of 30.45 ± 5.43 years [7]. In the report from WHO (2012), severe periodontal (gum) disease, in general population, which may result in tooth loss, is found in 15–20% of middle-aged (35-44 years) adults [11]. The study done by PD Garkoti et al. (2012), from a total of 8928 patients attended OPD, majority of patients were in 30-39 years of age group [12].

During the study, from 540 patients' visits, most common dental disease was dental caries in 33.13% followed by gingivitis in 16.98%. These results are quite similar to those found by Smadi L et al. (2011-2013) in Jordan, with dental caries in 31.6% and gingivitis in 28.7% [13]. In [12] in India found dental caries in 54.54% while gingivitis represented 37.62%. The study done by Raoul Bationo et al. in Burkina Faso (2015-2016) found dental caries at 47.1% [14].

Dental caries took lead of dental diseases in UN personnel. The same results are found in general population where Bruce A. Dye et al. (2011-2012) found that, approximately 91% of U. S. adults aged 20–64 had dental caries in permanent teeth in 2011–2012 [15].

Regarding dental caries and quadrant distribution, this study found a difference where maxillary jaw had 51.9% versus 49.1% for mandibular jaw. These results are comparable to those found by Mustafa Demirci et al. (2010) where caries distribution was higher in the maxillary jaw (62.4%) than in the mandibular jaw (37.6%) [16].

From the results, retained root caries represented 10.14% of all diagnosis. Other authors documented root caries among general and older adults: Hariyani N et al. (2017) found a prevalence of root caries of 25.3% in general adults of 15 + years old on a sample of 5505. This difference is due to sample size that included in general population those younger from15 and above years [17] while this study showed a range from 22 to 59 years old.

Like other authors, the prevalence rate of operculitis was 1.03%, these results are similar to those found in [12] and in [14]. Their studies found rates of pericoronitis being 0.53% and 2% respectively. In this study, the tooth 48 was 10 times concerned by operculitis than tooth 38 which is similar to the result of Ilgu Lee: In 250 military enlisted soldiers visiting the dental clinic, dental caries and pericoronitis relating to a

third molar are major frequent dental disease [18].

During analysis, one dry socket was found as complication occurring after tooth extraction in 0.2%. These findings are similar the those of Hasan Momeni et al. (2011) who found that, over two-month period of the study, among of 4,779 patients, the incidence of dry socket was 0.6% [19].

Among the management options of dental and periodontal disease, this study found tooth extraction rate of 19.92% for combined dental and periodontal diseases. These results are comparable to those found by Jackson TH, Guez C et al. (2017) in the records of 2184 consecutive patients treated, where the overall extraction rate was below 25% in 2006 [20]. And those found by Ribeiro LS et al., where 8% of 225 patients had lost one tooth or more and 20% had lost eight teeth or more [21].

A protection risk of 0.38 to develop periodontitis once age less than 37.57 years (younger) was found. These findings are similar to those found by Gina Thornton-Evans et al. (2009-2010) who showed that periodontitis rate increased with age where adults' aged ≥65 years increased periodontitis than those aged ≥30 years in the United States [22].

4. Conclusion

Dental conditions constitute health visits during conflicts, deployments, and field training exercises. They are prevalent at Rwanda Level 2 hospital in Bria. The different diseases and management have been documented. As per our hypothesis, dental caries were found to be the most common disease in this population. Particular statistical association of some diseased teeth has been shown.

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