

Epidemiology of Orofacial Clefts in Rwanda

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ABSTRACT

BACKGROUND: There is substantial variability in the relative frequency of orofacial clefts. The information available on orofacial clefts in Rwanda is limited. The aim of this study is to assess the frequency and geographical distribution of orofacial clefts in Rwanda.

METHODS: A retrospective cross-sectional study was conducted on records of orofacial cleft patients treated from January 2010 to December 2013, for a period of one month at ADEPR Nyamata, Kigali University Teaching Hospital and Rwanda Military Hospital. Patient information was retrieved from hospital records, extracted into standardized data collection forms, and cataloged using Excel 2013. The results were exported and analyzed using SPSS-version 16.0 software and presented using frequency distribution tables.

RESULT: A total of 339 orofacial cleft patients' records were reviewed. Of all the patients, 50.4% were male and the mean age was 8.43 ± 0.4 years [3 months, 65 years]. About 74% of all orofacial clefts were cleft lip, 18.9% cleft palate and 7.1% had both cleft lip and cleft palate. From the five provinces, 34.2% came from Eastern province.

CONCLUSION: There is a substantial occurrence of all types of orofacial clefts in all provinces, and cleft lip is the most common. A good number of adults with untreated orofacial clefts existed.

Keywords: Orofacial Cleft, Rwanda, University Teaching Hospital, Hospital Records

INTRODUCTION

Clefts of the lip and/or palate (CL/P) are common anomalies, accounting for 65% of congenital head and neck malformations [1]. Variation of occurrence of Orofacial Clefts (OFC) is substantial [2–4]. Several studies, using hospital-based information, report the difference in prevalence of orofacial clefts [5–10]. The prevalence of OFC ranges (Table 1) from 0.57/1000 to 1.57/1000 of live births [10]. The highest incidence is reported in Asia, and the lowest in Africa [10,11].

In African settings, there are conflicting reports on the epidemiology of orofacial clefts [7]. Birth prevalence of orofacial clefts in Africa varies from 0.5/1,000 recorded in Nigeria [12] to a high of 2/1000 reported in Rift Valley, Kenya [5]. The variation in the occurrence of orofacial clefts depends on genetic and environmental risk factors [13]. Butali and Mossey [3] in their review, reported on methodological uncertainty in hospital-based studies, suggesting that this may account for variations in reported data.

Studies from Africans and non-Africans show a change in the frequency distribution of cleft lip with or without palate [5–7,9]. Considerable gender variation is present in some epidemiological studies [4,12,14]. Rajabian and Aghaei in Iran [15], Agbenorku et al.,

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Study population: All hospital records for operated orofacial cleft patients during the study period were eligible for the study.

Inclusion Criteria: Only 339 patients' records with all study variables available such as types of clefts, age at presentation to hospital, gender and residential address were considered for analysis.

Exclusion criteria: Any patient record with any missing study variable were excluded.

Data collection: Files were retrieved after sorting the names from the hospital records. If records were not available, the patient's register was used to get the required information. The patients' information on types of orofacial clefts, age at presentation, gender, and residential area were extracted and recorded in the data collection forms. Coding of the information collected was done and filled in the computer daily using Statistical Package for Social Sciences (SPSS 16 for windows, Chicago, Illinois, USA).

Data analysis: Data analysis was done using SPSS version 16-computer software program and presented using frequency distribution tables.

Ethical consideration: Ethical approval was obtained from the Directorate of Research Ethics and Consultancy in the College of Medicine and Health Sciences of the University of Rwanda. Permission was granted from individual hospitals to access and use their hospital records.

Consent: This study used hospital records only. Researchers saw no patient. Each patient record was allocated an Identification Number (ID) on the data collection form to maintain confidentiality.

RESULTS

A total of 339 patients with orofacial clefts operated in the last four years from January 2010 to December 2013 at the three hospitals were analyzed. The information of patients managed by operation smile was not accessible at the time of this study. From the available data, the distribution of patients in each hospital is shown in Table 1.

Table 1: Age distribution of patients with orofacial clefts attended in the three hospitals

Age group in years	Nyamata		UTHK		RMH		Total	
	N	%	N	%	N	%	N	%
< 2	15	75	184	86.0	100	95.2	299	88.2
2-5	4	20	26	12.1	4	3.8	34	10
6-11	0	0	1	0.5	1	1.0	2	0.6
12-21	0	0	2	0.9	0	0.0	2	0.6
22-65	1	5	1	0.5	0	0.0	2	0.6
Total	20	5.9	214	63.1	105	31	339	100

UTHK: University Teaching Hospital of Kigali, RMH: Rwanda Military Hospital

The youngest patient in this study was three months and the oldest 65 years. Mean age was 8.43 ± 0.4 years. Males made up 50.4% of all the patients. Age distribution of patients operated for orofacial cleft is shown in Table 1. The patients treated for orofacial cleft below two years old were 88.2%. Patients above 22 years old were 0.6% (Table 2).

Table 2: Frequency distribution of orofacial clefts

Types of cleft	Frequency (n)	Percentage (%)
Cleft lip	251	74.0
Cleft palate	64	18.9
Cleft lip and palate	24	7.1
Total	339	100.0

Frequency distributions of the orofacial cleft are shown in Table 2. Out of 339 Patients operated for orofacial clefts, 74% had a cleft lip, and only 7.1% had a cleft palate. Frequency distribution of patients operated for orofacial clefts according to gender is shown in Table 3. About 51.4% of males were managed for cleft lip, and 54.2% of female patients were treated for cleft lip and palate. Overall M: F ratio was 1.02:1 (Table 3).

Table 3: Gender distribution of the patients with orofacial cleft attended at the three hospitals

Gender	Type of orofacial cleft						Overall	
	Cleft lip		Cleft palate		Cleft lip & palate		N	%
Male	129	51.4	31	48.4	11	45.8	171	50.4%
Female	122	48.6	33	51.6	13	54.2	168	49.6
M:F ratio	1.05:1		1:1.03		1:1.18		1.02:1	

n=339

Geographical distribution of patients according to districts and provinces is shown in Table 4. Eastern province had the highest patient population of 116, of which the majority were from the Gatsibo district (34.2%). The Western province had the lowest patient population of 41 patients, and many were from the Ngororero district (26.9%) (Table 4).

DISCUSSION

This is the first study on orofacial clefts in Rwanda. A literature search by Ovid Medline, PubMed, Scopus and Google search engines, using keywords such as orofacial clefts, cleft lip/palate in Rwanda, generated only one article by Conway et al., (2015) [20]. The article reported a general picture of the orofacial cleft in African countries, based on ten years' surgical experience. Substantial capture of infants with cleft palate in Rwanda as compared to other African countries is revealed by this study. Cleft palate alone is the second orofacial cleft after cleft lip; this is contrary to most of the studies that show no cleft palate at all [9]. Cleft palate is the least common orofacial cleft in both African and non-African countries [9,21]. Cleft palate was the least encountered in studies by Manyama et al., in Tanzania [22], Onyango and Noah in Rift valley in Kenya [7], and Spritz et al., in Nairobi Kenya [5], and Wilson and Hodge in Uganda [16]. This suggests that recruitment of patients born with cleft palate in Rwanda is better than in other African countries. This might be caused by the stronger health care system in Rwanda healthcare system compared to other African countries [23,24]. Cleft lip alone is the most common orofacial cleft among all cleft patients in Rwanda, which is similar to findings from most of

Table 4: Frequency distributions of orofacial clefts according to geographical area

Province (N=339)		Frequency (n)	Percentage (%)
Province	Eastern	116	34.2
	Western	41	12.1
	Northern	49	14.5
	Southern	72	21.3
	Kigali city	61	17.9
Districts of Eastern province (n=116)	Nyagatare	8	6.9
	Gatsibo	20	17.2
	Rwamagana	10	8.6
	Kayonza	13	11.2
	Ngoma	13	11.2
	Kirehe	7	6
	Bugesera	45	38.8
	Districts of Western province (n=41)	Karongi	4
	Ngororero	11	26.9
	Nyabihu	3	7.3
	Nyamasheke	5	12.2
	Rubavu	10	24.4
	Rusizi	4	9.8
	Rutsiro	4	9.8
Districts of Northern province (n=49)	Burera	5	10.2
	Gakenke	2	4.1
	Gicumbi	10	20.4
	Musanze	17	34.7
Districts of Southern province (n=72)	Rurindo	15	30.6
	Gisagara	8	11.1
	Huye	6	8.3
	Kamonyi	14	19.4
	Muhanga	14	19.4
	Nyamagabe	5	6.9
	Nyanza	10	13.9
	Nyaruguru	10	13.9
Districts of Kigali/central Province (n=61)	Ruhango	5	6.9
	Nyarugenge	14	22.4
	Kicukiro	18	30
	Gasabo	29	47.6

the African countries. Cleft lip occurred in more than half of the patients with orofacial clefts in this study, as found elsewhere in Africa [5,12,22]. Contrary to other studies in the region, this study

found that cleft lip and palate together was the least common orofacial cleft.

Slight male preponderance was revealed in this study in overall orofacial clefts, and in cleft lip, which is similar to findings from Uganda [16]. Our results are contrary to Onyango and Noah [7] in Kenya, where male preponderance is shown in all three types of orofacial clefts. In this study, female dominance was observed in cleft palate, and cleft lip and palate.

More than 75% of patients with OFC were captured below two years of age for surgery. There could be some adults who are not aware that orofacial cleft problems can be managed. A substantial number of captured adults with untreated orofacial cleft revealed this. 11.2% of patients were between 2 and 21 years, while two patients were between 22 and 65 years. This pattern has been reported in other studies in other developing countries as well [1,7]. From other studies late capturing has been suggested to be caused by the poorly-developed infrastructure for orofacial cleft healthcare and poor recording [9]. Other reasons for delayed capturing are financial issues, lack of awareness of treatment availability, superstition, fear of death from surgery, and long-distance from the health facility [4]. This scenario is shared by most developing countries; a majority of orofacial cleft patients are captured during surgical camps that provide free services.

Although geographical distribution by the residential address of the orofacial cleft patients in the five provinces is inclined towards the regions with the previous history of treatment by the visiting surgical team, a countrywide distribution of all forms of orofacial clefts is evident. The Eastern province reported the highest number of patients for orofacial cleft (34.2%). It is the area of collaboration with Smile Train that has been operating for a long time. Another surgical team from the USA usually visits Southern Province, and it reported the second highest number of patients (21.3%), and the third highest recorded in Kigali city (17.9%). Kigali city is the center of major camping for operation Smile and receives patients from all provinces. A small number of patients reported is contributed by missing information from Operation smile of South Africa. A high number of patients in the first three provinces could be related to exposure from visits of surgical teams.

Through organized surgical camps, Rwandan cleft surgeons can utilize the findings of this study, and surgical camps to better tailor their services to the population. This will result in cost-effective treatment of orofacial clefts and consequently further achievement in the reduction of infant morbidity and mortality.

Limitations

This study is based on the retrospective analysis of hospital records. Methodological use of hospital-based records is limited to capture all cases correctly. Hospital records have limitations related to the accuracy of recording and record keeping, leading to incomplete information for variables such as age, gender, and type of clefts. This contributed to the exclusion of many records. Furthermore, some detailed information such as maternal age, prenatal exposure and a complete classification of orofacial clefts were missing. Visiting organizations that use their data storage system could contribute to this challenge and

account for the insufficient information in host records. This situation impedes proper data analysis. Lack of access to data banks from visiting NGOs was an obstacle to obtaining information of many patients. However, the sample of patients studied was still substantial to provide relevant information to inform conclusions on some variables.

CONCLUSION

There is a substantial number of all three types of the orofacial clefts in Rwanda, distributed in all five provinces. A better capturing of patients with orofacial clefts is observed in Rwanda than other African Countries.

Further research involving the community is needed to establish prevalence and knowledge of the people on orofacial clefts and identify barriers to orofacial cleft treatment. Establishment of a national congenital defects registry is required to accurately estimate the prevalence and improve orofacial cleft management. Visiting NGOs should use the hospital data record system and ensure that patient records are made available to the hospital where they are treated.

Authors' contributions

All authors contributed to writing the manuscript for publication. The first author created the topic, supervised the students to col-

lect data and designed the manuscript for publication. The second author was co-supervisor of the work that students used to complete their degree requirement for the completion of Bachelor of Sciences with Honours in Dental Therapy. Other authors participated in reviewing the manuscript and aligning it to order; they were an instrumental for students to get more advice while working on the document.

Availability of data and materials

The data for this study is being held in the School of Dentistry, University of Rwanda, College of Medicine and Health Sciences. Data is kept according to the ethical approval of this study.

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