

Cleft palate: regional prevalence in the State of Minas Gerais in a specialized reference center

Fissura palatina: prevalência regional no estado de Minas Gerais em centro especializado referencial

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ABSTRACT

Objective: to identify the origin and some clinical, epidemiological parameters of patients seeking a cleft lip and palate specialized center in Belo Horizonte and who reside within the State of Minas Gerais. **Material and methods:** the sample was composed of 308 patients residing in Minas Gerais who arrived at the center without prior surgical treatment. The information was obtained from a secondary database containing the medical records of these patients. Data were analyzed according to the meso-region of the Minas Gerais State and the patients' city of origin (Campo das Vertentes, Central Mineira, Jequitinhonha, Noroeste de Minas, Norte de Minas, Oeste de Minas, Sul/Sudoeste de Minas, Triângulo Mineiro/Alto Paranaíba, Vale do Mucuri, Vale do Rio Doce, and Zona da Mata). The following variables were analyzed: gender, age at the time of treatment, and type of cleft. **Results:** no statistical predominance was observed in any gender. We observed a statistically significant occurrence for "up to one year" (69%) in relation to the age when treatment was sought. Cleft lip was the most frequent type of cleft (36%). Among the 308 patients from meso-regions in Minas Gerais, the majority was concentrated in the Central region while the Triângulo Mineiro/Alto Paranaíba region comprised the smallest number of patients. **Conclusion:** the origin of the largest number of patients seeking a cleft lip and palate specialized center care in Belo Horizonte is in the Central region of Minas Gerais.

Key words: Cleft Palate; Cleft Lip; Congenital Abnormalities/ epidemiology; Population Characteristics; Residence Characteristics.

RESUMO

Objetivo: identificar a procedência e alguns parâmetros clínico-epidemiológicos de pacientes que procuram centro especializado em fissura labiopalatina em Belo Horizonte e que residem no interior do estado de Minas Gerais. **Casística e Métodos:** a amostra foi composta de 308 pacientes residentes no interior de Minas Gerais que chegaram para atendimento no referido centro sem tratamento cirúrgico prévio. As informações foram obtidas por meio de banco de dados secundário contendo o cadastro dos pacientes. Os dados foram analisados de acordo com a mesorregião do estado de Minas Gerais, da cidade de origem dos pacientes (Campo das Vertentes, Central Mineira, Jequitinhonha, Noroeste de Minas, Norte de Minas, Oeste de Minas, Sul/Sudoeste de Minas, Triângulo Mineiro/Alto Paranaíba, Vale do Mucuri, Vale do Rio Doce e Zona da Mata). Analisaram-se as variáveis gênero, idade de busca do tratamento e tipo de fissura apresentada. **Resultados:** para nenhum dos gêneros houve predominância estatística. Em relação à idade em que buscaram tratamento, observou-se ocorrência estatisticamente significativa para "até um ano" (69%). Quanto ao tipo de fissura, a labiopalatina foi a mais frequente (36%) e entre os 308 pacientes das mesorregiões de Minas Gerais a maior parte se concentrava na região Central Mineira, enquanto o Triângulo Mineiro/Alto Paranaíba compreendia o menor número desses pacientes. **Conclusão:** está na mesorregião Central

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Mineira a origem do maior número de pacientes que procuram centro especializado de atendimento de fissura labiopalatina de Belo Horizonte.

Palavras-chave: Fissura Palatina; Fenda Labial; Anormalidades Congênitas/epidemiologia; Características da População; Distribuição espacial da população.

INTRODUCTION

Cleft lip and/or cleft palate result from congenital malformations consequent from failures in the development and maturation of embryonic processes between the 4th and 8th week of intrauterine life. It is found in the frequency from 1:500 to 1:700 births, which puts it in the position of one of the most common congenital facial anomalies.^{1,2} The usually most frequent cleft is the complete cleft lip-palate, and males are the most affected.³⁻¹⁴

A cleft lip and/or cleft palate present a multifactorial etiology including genetic and environmental factors. Mothers exposed to teratogenic factors in early pregnancy have increased chances to have children with cleft lip-palate.^{1,7} The prevalence of craniofacial anomalies may vary according to geographic regions, seasonality, social class, ethnicity and age of parents, drug use, and maternal smoking habit.^{8,15,16} The prevalence of cleft lip and/or palate has increased in recent decades.⁹ It is believed that, in fact, this trend is due to the increase in notifications and, therefore, the registration of a number of cases that is closer to the real number.⁹

It is important for the patient with a cleft to receive follow-up from birth, conducted by a multiprofessional team, with an interdisciplinary approach and comprehensive treatment. This treatment involving teams of doctors, dentists, speech therapists, psychologists, and social workers among others, provides the individual with the facial deformity to have a good quality of life, integrated into the society.¹ However, in Brazil there are still many patients who arrive late for treatment, during adolescence or even at adult age.¹⁴ This fact must be justified by the lack of knowledge about treatment options and information about the specialized centers in the country.

In the specialized staff, the speech therapist plays a fundamental role because these patients may present significant changes in feeding and communication processes.¹⁷ Communicative alterations resulting from cleft palate are complex and impair speech intelligibility of the patient. The treatment for adequacy of speech in these patients may be surgical, prosthetic, or through

speech therapy, depending on the case. Speech therapy, if indicated, must be performed one or more times per week. Because of distance issues, patients who live far from specialized centers need to perform this treatment in their hometowns or near them, with periodic returns to the center for monitoring the evolution of the case and the establishment of the indicated conducts.

Since 2005, Belo Horizonte has the Treatment and Rehabilitation Center of Cleft lip and/or palate and Craniofacial Deformities (CENTRARE), specialized in the treatment of patients with cleft lip and palate, delivering assistance to individuals not only in Belo Horizonte, but the entire State of Minas Gerais, becoming the reference in the area.^{11,12} The State of Minas Gerais has, so far, only two reference centers for the treatment of cleft patients, one in the Baleia Hospital in Belo Horizonte (CENTRARE) and another in Alfenas (Pro-Sorriso Center) in the Southern/Southwestern mesoregion of Minas.¹⁸

This study aimed to identify the region in the countryside of Minas Gerais from where patients with cleft lip and/or palate come to be treated at CENTRARE of Belo Horizonte in order to enable improved structuring in the services provided by this center.

METHODS

This study was analyzed and approved by the Ethics Committee in Research of the Baleia Hospital (Opinion 018/2010).

It is a retrospective study, from the compilation of secondary data from all patients with craniofacial malformations, registered in CENTRARE between 2005 and 2010. Data collected were gender, date of birth, the age of arrival at CENTRARE, address, district/city, and type of cleft presented.

The study samples excluded patients who arrived at the center with any previous lip and/or palate surgery; patients with another type of craniofacial malformation not associated with cleft; patients residing in Belo Horizonte or in the metropolitan region of Belo Horizonte (RMBH); and entries that did not contain all the necessary information.

The types of cleft were classified according to the model proposed by Spina et al.¹³, which classifies clefts by extension into three main groups (incisive pre-foramen cleft, incisive trans-foramen cleft, and incisive post-foramen cleft) and their subdivisions (complete or incomplete, bilateral, median or unilat-

eral, right or left) considering the incisive foramen as the anatomical reference.

Based on addresses, cities and regions where patients from were identified. The Brazilian Institute of Geography and Statistics (IBGE) divides the State of Minas Gerais into 12 mesoregions: Campo das Vertentes, Central Mineira, Jequitinhonha, metropolitan Belo Horizonte, northwestern Minas, northern Minas, western Minas, southern/southwestern Minas, Triângulo Mineiro/Alto Paranaíba, Mucuri Valley, Rio Doce Valley, and Zona da Mata.

The statistical analysis was performed using the MINITAB 16 software by the hypothesis test for proportions with the goal to determine whether the occurrence of each gender, age seeking treatment, and type of cleft had statistically significant frequency (over 50% of the population). In addition, this test was conducted with the objective of comparing proportions between cities and regions. In Table 4, it was considered that the relative frequencies of occurrences per region follow the Poisson distribution. Thus, the p-values presented result from the hypothesis testing with this distribution without approximation to a normal distribution. The chi-square test was used to verify statistical significant in associations between regions and age seeking treatment and type of cleft. The significance level of 5% was adopted for all tests.

RESULTS

The data from 1,370 CENTRARE patients medical records were collected. Of these, 564 were excluded because they arrived at the center with some lip, and/or palate surgery carried out previously; 76 for not having a cleft lip and/or palate; 361 because they live in Belo Horizonte or MRBH; 61 because their medical record did not contain all the information necessary for the study. Therefore, the data regarding 308 patients living in the state of Minas Gerais were analyzed, who arrived at the center with up to 52 years of age.

There was no significant statistical predominance for either gender (Table 1). Regarding the age at which they sought treatment, the statistical significance was observed in the group of “up to one year.” As for the type of cleft, the incisive post-foramen was the most frequent, however, without statistically significant occurrence.

Among the 308 patients living in the countryside of Minas Gerais, most live in the Central Mineira re-

gion while the Triângulo Mineiro/Alto Paranaíba is the home for the smallest number of patients (Table 2).

Table 1 - Distribution of patients from regions in the countryside of Minas Gerais according to gender, age, and type of cleft

Variable	N (n=308)	%	p value	
Gender	Male	168	54.55%	0.062
	Female	140	45.45%	0.951
Age	Up to one year old	212	68.83%	0.000*
	Older than one year old	96	31.17%	1.000
Type of cleft	Lip	56	18.18%	1.000
	Palate	139	45.13%	0.961
	Lip and palate	111	36.04%	1.000
	Submucosa	2	0.65%	1.000

Hypothesis test for proportions (p<0.05). * Statistically significant values

Table 2 - Distribution of sampled patients from regions in the countryside of Minas Gerais

Region	n (n=308)	%
Central Mineira	100	32.47%
Vale do Rio Doce	48	15.58%
Zona da Mata	37	12.01%
Norte de Minas	33	10.71%
Oeste de Minas	33	10.71%
Jequitinhonha	31	10.06%
Vale do Mucuri	12	3.90%
Campo das Vertentes	6	1.95%
Noroeste de Minas	4	1.30%
Sul/Sudoeste de Minas	3	0.97%
Triângulo Mineiro/Alto Paranaíba	1	0.32%

Considering the population size of each mesoregion, Central Mineira region stands out with the higher relative frequency, followed by Campos das Vertentes. However, the Triângulo Mineiro/Alto Paranaíba stands out as the regional with the lowest relative frequency, followed by the southern/southwestern of Minas Gerais and Northern Minas (Table 3).

In order to verify if the Central Mineira and Triângulo Mineiro/Alto Paranaíba mesoregions show statistically the highest and lowest relative frequency, the exact significance levels (p-value) between each regional and prominent regional were calculated (Table 4). From this analysis, it was found that the Central Mineira region presents the highest relative frequency because a statistically significant difference was observed between this region and all others. The Triângulo Mineiro/Alto Paranaíba, in turn, showed a statisti-

cally significant difference between all other regions except with the southern/southwestern of Minas. Thus, we cannot consider the relative frequency of the Triângulo Mineiro as statistically lower than all other regions. However, there is statistically significant evidence to assert that the Triângulo Mineiro/Alto Paranaíba has a relative frequency lower than northern Minas, northwestern Minas, Zona da Mata, Rio Doce Valley, Mucuri Valley, western Minas, Jequitinhonha, Campos das Vertentes, and Central Mineira.

There was a statistically significant association between type of cleft and region of patient's origin ($p = 0.024$).

Table 3 - Distribution of patients from regions in the countryside of Minas Gerais according to their population

Regional	Population *	n (n=308)	%
Central Mineira	466.521	100	0.021435%
Campo das Vertentes	56.007	6	0.010713%
Jequitinhonha	694.120	31	0.004466%
Oeste de Minas	922.656	33	0.003577%
Vale do Mucuri	370.203	12	0.003241%
Vale do Rio Doce	1.588.122	48	0.003022%
Zona da Mata	2.175.254	37	0.001701%
Noroeste de Minas	343.383	4	0.001165%
Norte de Minas	6.591.507	33	0.000501%
Sul/Sudoeste	2.463.618	3	0.000122%
Triângulo Mineiro/ Alto Paranaíba	2.141.060	1	0.000047%

* Source: Brazilian Institute of Geography and Statistics (IBGE) – Demographic Census 2011.

Table 4 - Exact significance levels (p value) for comparisons between regions focusing on those with the highest and lowest relative frequency

Regional	Central (highest)	Triângulo Mineiro (lowest)
Central de Minas	–	0.000*
Campo das Vertentes	0.000*	0.000*
Jequitinhonha	0.000*	0.000*
Oeste de Minas	0.000*	0.000*
Vale do Mucuri	0.000*	0.000*
Vale do Rio Doce	0.000*	0.000*
Zona da Mata	0.000*	0.000*
Noroeste de Minas	0.000*	0.002*
Norte de Minas	0.000*	0.001*
Sul/Sudoeste de Minas	0.000*	0.367
Triângulo Mineiro/Alto Paranaíba	0.000*	–

Hypothesis test for proportions ($p < 0.05$). * Statistically significant values.

DISCUSSION

A tendency towards males, although not statistically significant, was observed in this study. In most studies involving people with cleft lip and palate, there is a predominance of males, especially when the cleft reaches the lip.^{3,6,7,14}

Regarding the type of cleft, incisive post-foramen was the most frequent in this study, disagreeing with other studies where the most frequent type was the incisive trans-foramen.^{1,7,14} The fact that the most common cleft type was the incisive post-foramen in this study, can justify the lack of significant difference between genders because the isolated cleft palate is more common in females than in males.

It is important to highlight that age of arrival at CENTRARE of most patients in this study was less than one-year-old. This occurred regardless of the type of cleft presented by patients, none of them had received prior treatment or surgical intervention. This search for early treatment contributes to better outcomes, both aesthetic and functional. The fact that parents sought after care in the first year of life allows the patients to receive expert guidance and surgical interventions in the recommended steps.¹⁷

The fact that the Central Minas meso-region, excluding the RMBH, being the source region of most CENTRARE patients, can be explained by its proximity to downtown.

The Triângulo Mineiro/Alto Paranaíba mesoregions the region with the lowest number of patients participating in this study. One can hypothesize that these patients seek other specialized services, such as central Alfenas¹⁸ in the southern/southwestern of Minas mesoregion, or even other centers in São Paulo before coming to CENTRARE because these are geographically closer.

Other specific investigations are needed for the analysis of other mesoregions in order to verify if the distance from downtown was a determining factor in the search for a specialized center.

Although the present study shows that the demand for treatment has been early in the State of Minas Gerais, in many cases this treatment was sought belatedly, which coincides with the findings of other national studies. This delayed seeking for treatment can cause alterations in speech and hearing and loss in facial aesthetics, compromising the communicative function and interfering with the quality of life. Thus, it is necessary to disclose the importance of early

treatment and the existence of specialized centers to the population and public health care professionals.

Knowing the source locations of patients in a treatment center allows the development of specific actions for the population served.

In distant regions, but with high proportional presence of patients with cleft, the acting with the municipal health departments is suggested in order to discuss the need to create new centers or the development of professional training programs to assist patients with cleft lip and palate. This benefits patients who live far from specialized centers, preventing that frequent returns cause constant absences from school and work, expenses and physical and emotional exhaustion, which could compromise the quality of care and generate adherence difficulties.

Based on the obtained results, there is a need for further research in order to investigate whether in regions with the highest proportional presence of patients with cleft, some etiologic factor is present and predisposing pregnant women to generate babies with cleft.

Conversely, it is recommended, in the regions of low frequencies, an outreach work by specialized centers, advising on ways of referring patients.

CONCLUSION

The Central Mineira mesoregion is the region of in the State of Minas Gerais with the highest number of CENTRARE patients residing in the state's countryside.

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