



Pesquisa Brasileira em Odontopediatria e
Clínica Integrada

ISSN: 1519-0501

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Universidade Estadual da Paraíba
Brasil

Silva Santos, Jacqueline; Lara do Amaral, João Henrique; Clemente Palmier, Andréa;
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Brazil: A Cluster Analysis
Pesquisa Brasileira em Odontopediatria e Clínica Integrada, vol. 17, núm. 1, 2017, pp. 1-7
Universidade Estadual da Paraíba
Paraíba, Brasil

Available in: <http://www.redalyc.org/articulo.oa?id=63749543052>

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Original Article

Hospital Dental Treatment for Special Health Care Needs Patients in Minas Gerais state, Brazil: A Cluster Analysis

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Academic Editors: Alessandro Leite Cavalcanti and Wilton Wilney Nascimento Padilha

Received: 11 June 2017 / Accepted: 25 September 2017 / Published: 04 October 2017

Abstract

Objective: To describe and group some demographic and healthcare characteristics of hospital dental care for the special health care needs population. **Material and Methods:** Cross-sectional census survey with a total of 1,063 visits with special health care need patients under general anesthesia or sedation at the Brazilian Health System Minas Gerais, Brazil, over 12 months. Clinical diagnosis was divided into “mental and behavioral disorders and diseases of the nervous system” and “others”. Age group, gender, clinical diagnosis and care by a general dentist were submitted to descriptive and multivariate cluster analysis. The analysis was performed using the software SPSS version 19.0. **Results:** Cluster 1 (N=173) had no ICD codes for nervous system (NS) diseases and mental and behavioral disorders. Clusters 2 (N=564) and 3 (N=326) are quite similar except for gender distribution. Cluster 1 was 3.5 times more frequent among non-host cities than HER host cities. Dental treatment was mostly performed on males diagnosed with mental and behavioral disorders and diseases of the NS who were over the age of 25 years and were seen by general dentists. The clusters were distributed unevenly between EHR host and non-host cities. **Conclusion:** Non-host performed more frequently treatment for patients with no mental and behavioral disorders and diseases of the NS than EHR host cities.

Keywords: Dental Care for Disabled; Health Care Surveys; Cluster Analysis.

Introduction

Although many people with special health care needs can be seen at primary health care units, there is a demand for dental care under general anesthesia or sedation in the hospital environment [1-4]. The prescription of sedation or general anesthesia is linked to the impossibility of providing outpatient dental treatment due mainly to cognitive impairments, emotional conditions and complex medical conditions that require monitoring during dental treatment [1,5-10].

In the state of Minas Gerais, Brazil it is currently recommended that hospital dental care for patients with special health care needs in the Brazilian Health System (SUS) be established in each of the 19 host cities of the 13 Extended Health Regions (EHR). The remaining 834 cities in this state should refer people with special health care needs according to the medical and/or behavioral condition of each individual [11]. The recommendation for the dental treatment to be performed at these 19 host cities is based, among others, in the economy of scale and scope [12].

Since 2010, the procedure "Dental Treatment for Patients with Special Health Care Needs" has been included in the SUS payment table. The procedure consists of preventive, restorative and surgical dental procedures performed in a hospital setting under general anesthesia or sedation for patients with one or more temporary or permanent intellectual, physical, sensory and/or emotional impairment that prevents them from being seen in a conventional dental setting. When authorized by the SUS, the procedure generates an Authorization for Hospitalization (AIH), with subsequent payment for the performed procedure [13].

A multivariate description of some characteristics of this service, among cities that were EHR hosts and non-hosts, may contribute to planning, monitoring and evaluating this health service. Hence the objective of this study is to describe some demographic and healthcare characteristics of hospital dental care performed for special health care needs patients in the SUS, state of Minas Gerais, during the period that immediately preceded the implementation of the state policy for dental care under sedation or general anesthesia in the hospital setting. The characteristics were grouped by similarity and were described in cities that were EHR hosts and non-hosts.

Material and Methods

Study Design

This descriptive and quantitative study uses secondary data referring to AIHs recorded as paid by the SUS in the state of Minas Gerais for the implementation of the procedure "Dental Treatment for Patients with Special Health Care Needs" from July 2011 to June 2012.

The state of Minas Gerais is the second most populated state in Brazil, with an estimated population of 19,597,330 people in 2010. It is located in southeastern Brazil and has 853 cities. The State Health Department of Minas Gerais (SES-MG) divides geographically the state into 13 EHRs to manage the Brazilian Health System in the state.

Data Collection

The Hospital Information System/SUS, the National Registry of Health Facilities and the Hospital Information System/SES-MG were used for data collection.

This study analyzed the 1,063 AIHs that were paid during the period mentioned above. Four demographic and healthcare variables of patients with special health care needs were analyzed. Age was divided by the median value, and gender was separated into males and females. Clinical diagnosis was divided into “mental and behavioral disorders and diseases of the nervous system” and “others”. Mental and behavioral disorders and diseases of the nervous system (NS) comprised most of cases (78.8%) among patients treated; the category “others”, referred to other pathologies belonging to 11 International Statistical Classification of Diseases and Related Health Problems, 10th revision (ICD-10) groups. In addition, we assessed whether a general dentist exclusively conducted the services or if a specialist was present.

Statistical Analysis

All of these variables were analyzed by descriptive statistics and cluster analysis. Cluster analysis is a multivariate, descriptive and exploratory statistical method that allows for the organization of data (i.e., AIHs in this study) into groups by combining independent variables (age, gender, clinical diagnosis, general dentist/specialist) and maximizing similarities within each group (cluster) and then doing the same with regards to the differences between the groups; that is, groups were formed that were internally homogeneous and heterogeneous between each other. We used multivariate agglomerative hierarchy technique based on the farthest neighbor with squared Euclidian distances [14]. Three types of clusters (from two to four) were formed with the 1,063 AIHs analyzed. The choice of three clusters was due to a better understanding of the phenomenon (demographic and clinical characteristics of the patients treated under sedation or general anesthesia). The cluster ratio was calculated between host and non-host cities of each EHR. The analysis was performed using the software SPSS version 19.0.

Ethical Aspects

The study was submitted, reviewed and approved by the Research Ethics Committee of the Federal University of Minas Gerais (Universidade Federal de Minas Gerais) (Protocol no. 10311412.7.0000.5149). Written consent from each patient was not obtained because the data was from public databases. Patient information was anonymized and de-identified prior to analysis.

Results

The procedures were performed in 43 hospitals, and 39.5% were located in EHR host cities. Three EHR host cities did not perform any services. The host cities conducted 855 dental treatments (80.4%), while non-host cities performed 208 (19.6%).

The sociodemographic and clinical characteristics of the three clusters are shown in Table 1. When compared to the other groups, cluster 1 had a lower rate of AIHs for patients with age over 25

years, an intermediate rate for women, no ICD codes for NS diseases and mental and behavioral disorders and an intermediate rate for treatments that general dentists performed exclusively. Clusters 2 and 3 are quite similar except for the absence of treatment for women in cluster 2 and the absence of male patients in cluster 3.

Table 1. Sociodemographic and clinical characteristics of the three clusters, Minas Gerais, Brazil, 2011 and 2012.

Variables	Cluster 1 (N=173)	Cluster 2 (N=564)	Cluster 3 (N=326)
Age over 25 years	41.0%	48.4%	55.8%
Female gender	51.4%	0.0%	100.0%
ICD codes (mental and behavioral disorders and NS disease)	0.0%	90.8%	100.0%
Treatment performed exclusively by a general dentist	76.9%	64.9%	78.2%

Both host and non-host cities had high rates of cluster 2. Cluster 1 was 3.5 times more frequent among EHR non-host cities (38.0%) than EHR host cities (11.0%) (Table 2).

Table 2. Proportions of the three clusters by Extended Health Region (EHR) host and non-host cities, Minas Gerais, Brazil, 2011 and 2012.

	Cluster 1	Cluster 2	Cluster 3	Total
EHR host city (N=855)	11.0%	55.0%	34.0%	100.0%
EHR non-host city (N=208)	38.0%	45.2%	16.8%	100.0%

Discussion

This description of hospital dental services for patients with special health care needs revealed that there were clinical and sociodemographic differences among the evaluated patients. In addition, the distribution of these services was different between EHR host and non-host cities.

Cluster 2 had the highest number of AIHs, and most of the patients were male adults with ICD codes for NS diseases and mental/behavioral disorders. Similar results with regards to age and gender have been previously reported [15-17], as have the mental and cognitive impairments exhibited by most patients undergoing these types of dental treatment [13,16,18].

The fact that most patients were adults may indicate a deficiency in primary dental care of people with special health care needs at earlier ages, which would constitute a more preventive approach [19]. The lack of access to preventive care among children with special health care needs has been identified in Brazil [20] and in the USA [21].

Most patients in clusters 2 and 3 had diagnoses of mental and behavioral disorders and diseases of the NS, although there were significant differences with regards to gender. In these groups, regardless of gender, the presence of mental and behavioral disorders in adults, in addition to the likely increase in strength, could make it even more difficult to manage behavioral issues during dental treatment in an outpatient or office setting. Dealing with such issues in patients with special health care needs is a major challenge in the professional routine [22].

Additionally, with regards to clinical diagnosis, cluster 1 services were noted for the absence of ICD codes for mental and behavioral disorders and diseases of the NS. This finding may represent inadequate prescription for this type of dental treatment or services for patients with complex and systemic conditions or syndromes. Because cluster 1 had the highest rate of young patients, the chance that these patients present with serious chronic systemic conditions is lower [23,24].

In Brazil, only anesthesiologists can perform deep sedation and general anesthesia. Dentists qualified at educational institutions can perform sedation with nitrous oxide, but the technique requires the collaboration and cooperation of the patient to wear the inhalation mask [25,26]; therefore, it was most likely not performed in the studied cases.

The high rate of general dentists in the three identified clusters can be explained based on several reasons. The lesser challenges of behavior management inherent to dental care under general anesthesia or deep sedation may explain the presence of general dentists. In addition, administrative matters of the Brazilian Health System related to the hiring of specialists, the type of funding and costs may explain the low participation of specialized dentists. However, it may be that the general dentist is the best suited professional to perform this type of service, as restorative procedures and extractions are the procedures performed most frequently [16,27-29].

According to the Brazilian Health System framework in the state of Minas Gerais, this type of service should take place in EHR host cities. Although most procedures were performed in these EHR host cities, most hospitals where services were performed were not located in EHR host cities, indicating a geographical dispersion of care; that is, few services were performed in several establishments. The performance of dental treatments under general anesthesia in EHR host establishments would increase the possibility of achieving economies of scale [12]. The services that should be dispersed are those that do not benefit as much from economies of scale, for which there are sufficient resources and where distance is fundamental for accessibility [30].

As previously discussed, the high rate of cluster 1 in non-host cities compared to host cities may suggest inadequate prescription or services to patients with other systemic conditions [24,25]. This aspect of dental services in non-host cities, along with the likely absence of economies of scale, indicates the need for more detailed reviews of hospital care in these establishments. It would be important to conduct further studies to evaluate the structure, process and results of the hospitals in these healthcare settings.

This study has limitations common to studies using secondary data. Nevertheless, it is useful for providing a better understanding of the characteristics of services performed in this Brazilian state, grouping them and allowing a better description of the healthcare and clinical profile according to EHR. In this context, the study may contribute to state management issues related to planning of the Oral Healthcare Network (*“Rede de Atenção à Saúde Bucal”*) and the evaluation of policies implemented in Minas Gerais, Brazil, and in other places with similar health services.

Conclusion

Hospital dental care for special health care needs patients in these evaluated healthcare settings were mostly performed on males diagnosed with mental and behavioral disorders and diseases of the NS who were over the age of 25 years and were seen by general dentists. The clusters were distributed unevenly between EHR host and non-host cities. Non-host cities performed more frequently dental treatment for patients with no mental and behavioral disorders and diseases of the NS than EHR host cities, suggesting inadequate prescription for this type of dental treatment.

Acknowledgments

State Health Department of Minas Gerais (SES-MG), Minas Gerais State Research Foundation (FAPEMIG) and Coordination for the Improvement of Higher Education Personnel (CAPES). Mauro H N G Abreu is fellow from National Counsel of Technological and Scientific Development (CNPq), Brazil.

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