

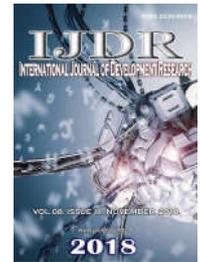


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EQUITY IN ACCESS TO CATARACT SURGERIES IN A BRAZILIAN REGION: HEALTH CARAVAN PROGRAM

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ABSTRACT

This article aims to assess equity in the population's access to cataract extraction procedures in the Health Caravan Program and its coverage in Mato Grosso do Sul, Brazil. It is a cross-sectional study, with analysis of secondary data from the Informatics Department of the Ministry of Health and productivity reports of the Health Caravan Program with standardization of the coefficient of cataract surgeries in Brazil. The results showed the execution of 13,361 cataract surgeries in 2015 and 23,340 in 2016. There was no significant difference in the distribution of surgical procedures among the public health regions. However, the increase in the amount of surgeries is relevant when analyzing the number of procedures performed in each public health region, which indicates a repressed demand. The Health Caravan Program expanded people's access to the surgical procedure to eliminate cataracts. The coefficient of cataract surgeries exceeded the average of the previous year in the state, as well as the national average. Considering a demographically dispersed area such as Mato Grosso do Sul, this program proved to be a good alternative to ensure people's access to the surgical procedure.

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INTRODUCTION

Universal health coverage, which encompasses access to public health services, is one of the millennium development goals defined by the United Nations (Buss et al., 2016). The idea that health must be present in all public policies is in the 2030 agenda and has been ratified by the signatory countries of the Pan American Health Organization (PAHO). In this context, equity becomes the most important measure of development of a region (Costa, Gartner, 2017).

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With the same logic, and due to the high prevalence of preventable blindness in Latin America as a whole, the health ministers of the Americas approved the Action Plan for Preventing Blindness and Visual Impairment, in order to reduce inequities in access to health services. The goal is solving the problem until the year of 2020 (Silva et al., 2015). With the increase in life expectancy and the aging of the population, in addition to chronic diseases such as Systemic Arterial Hypertension and Diabetes Mellitus, the prevalence of visual problems increases along with the number of elderly people. Regardless of social class, the incidence of blindness rises due to advanced age (CBO, 2015). Cataract is the leading cause of preventable blindness in low- and middle-income countries, and both its occurrence and access to health care are

unevenly distributed (Ramke *et al.*, 2017). Latin America and the Caribbean comprise the most unequal region in terms of distribution of goods, services, social and health conditions. Inequalities persist and the highest rates of preventable blindness and visual impairment are among low-income and rural people, who face the most hindrance when accessing both primary and advanced health services (Silva *et al.*, 2015). In Brazil, the three major causes of blindness that affect the elderly are glaucoma, age-related macular degeneration and cataract (CBO, 2018). In Mato Grosso do Sul, in 2015, the State Department of Health defined the strategic plans for consolidating the regionalization of health as public policies. One of the programs that were created is called Health Caravan, which provides consultations, exams and medium complexity surgeries for all of the eleven public health micro-regions of the state, with the goal of expanding service coverage. Among the many services offered by the program, attention is drawn to cataract extraction surgeries (Brasil, 2015). This article analyzes equity in population's access to cataract surgeries as a result of the health policy adopted in Mato Grosso do Sul: the Health Caravan Program.

MATERIALS AND METHODS

Study Scenario: Mato Grosso do Sul is a state in Brazil's Midwest region, bordering Bolivia and Paraguay and five other Brazilian states. It has a population of 2,713,147 inhabitants in 35,7145,531 square kilometers, which represents a low demographic density, of approximately 6.86 inhabitants per square kilometer, distributed in 79 municipalities distant from each other and predominantly of small size (IBGE, 2010). Thus, the health system in the state was organized in four public health macro-regions, with eleven municipalities being the center of a micro-region, each with a hospital and outpatient clinic qualified for medium and high complexity assistance with the main medical specialties. Given the significant territorial extension and low demographic density, population's access to the most complex health services demands a networked organization with efficient transportation and communication logistics in order to ensure equity. However, most health services are currently concentrated in Campo Grande, capital of the state.

Study Design: this is a cross-sectional study that discussed the Health Caravan Program regarding the performance of cataract extraction surgeries in Mato Grosso do Sul. It presents the amount and distribution of procedures throughout the years of 2014 (before the advent of Health Caravan), 2015 and 2016. The information was extracted from the Informatics Department of the Ministry of Health (DATASUS), through outpatient information system (Sistema de Informação Ambulatorial - SIA) and hospital information system (Sistema de Informação Hospitalar - SIH) (Brazil, 2018). TabWin version 4.14 was used to extract the data. Production reports of the Health Caravan Program from the Department of Health of Mato Grosso do Sul were made available for study through tables in Microsoft Excel version 16.0. The Health Caravan professionals adopted the 10th revision of the International Classification of Diseases (ICD-10), which includes Z01.0 (eye and vision examination) and H25.9 (unspecified senile cataract) and the procedures in this study were selected according to it (WHO, 2008).

Composition of the analysis: variables analyzed in this study were: 1) number of inhabitants per public health region in the

years 2014, 2015 and 2016; 2) number of inhabitants per public health region over 40 years of age with estimated number of unspecified senile cataract by municipality of residence; 3) number of cataract surgeries performed by municipality of residence. For the estimates of Brazilian population and population by each public health region in Mato Grosso do Sul, data from the demographic census of 2010 by the Brazilian Institute of Geography and Statistics (IBGE, 2010) and its estimates for population over 40 years of age in 2016 were used (IBGE, 2016). Age of population was standardized for the entire population of the state by the indirect method, based on the Latin American population older than 40 in the age groups of 40 to 64, 65 to 74 and 75 years or more. For the statistical analysis, the population of Mato Grosso do Sul was standardized using information from the population projection by the Latin American and Caribbean Demographic Observatory of the United Nations (ECLAC, 2015). In order to estimate the amount of cataract cases and cataract extraction surgeries in Brazil, we used the following data of prevalence of senile cataract: in 17.6% of people under 64 years of age; in 47.1% of the age group from 65 to 74 years; 73.3% in individuals over 75 years of age (CBO, 2018).

Data assessment and processing: descriptive statistical assessments with prevalence stratified by age groups (<64 years, 65-74 years, > 75 years) were performed. Maps were created to present the proportional distribution of surgeries per population over 40 years of age. A geographic information system of the open source software QGIS was used and quantile was the classification method chosen, in which each interval has a uniform quantity of objects, consisting of the representation of the public health regions. This study was approved by the Research Ethics Committee of the Federal University of Mato Grosso do Sul, under Opinion no. 2,152,157, CAAE: 69784517.0.0000.0021.

RESULTS

In 2014, before the Health Caravan Program existed, 1,408 cataract surgeries were performed in Mato Grosso do Sul (16.08 surgeries per 10 thousand inhabitants), with no information on queues or repressed demand. With Health Caravan, 13,361 and 23,340 cataract surgeries were performed in 2015 and 2016 respectively, with a total of 36,701 surgeries (402.34 surgeries per 10 thousand inhabitants over 40 years of age). In 2015 and 2016, cataract surgeries were performed in seven and four regions of the state respectively, therefore distributing the service among all public health regions of Mato Grosso do Sul (Brasil, 2016; Brasil, 2017). The procedures registered in the program indicate that, out of the 36,701 surgeries performed, 16,582 (45.18%) were in men and 20,119 (54.82%) in women. Regarding distribution by age, 86.99% of the surgeries occurred in people over 60 years of age, of whom 30.15% were older than 64, 45.39% were 65 to 74, and 24.46% were older than 75. The cataract extraction surgeries were distributed by region according to the map presented in Figure 1. The difference in the number of surgeries performed before and after the Health Caravan Program is highlighted. The estimate of people with cataracts in the state of Mato Grosso do Sul and comprehensiveness of surgeries by public health micro-region can be observed in Table 1. Brazil has 205,743,000 inhabitants over 40 years of age and has performed 788,366 cataract surgeries through the Unified Health System (Sistema Único de Saúde - SUS) in the years of 2015 and 2016, resulting in a ratio of approximately

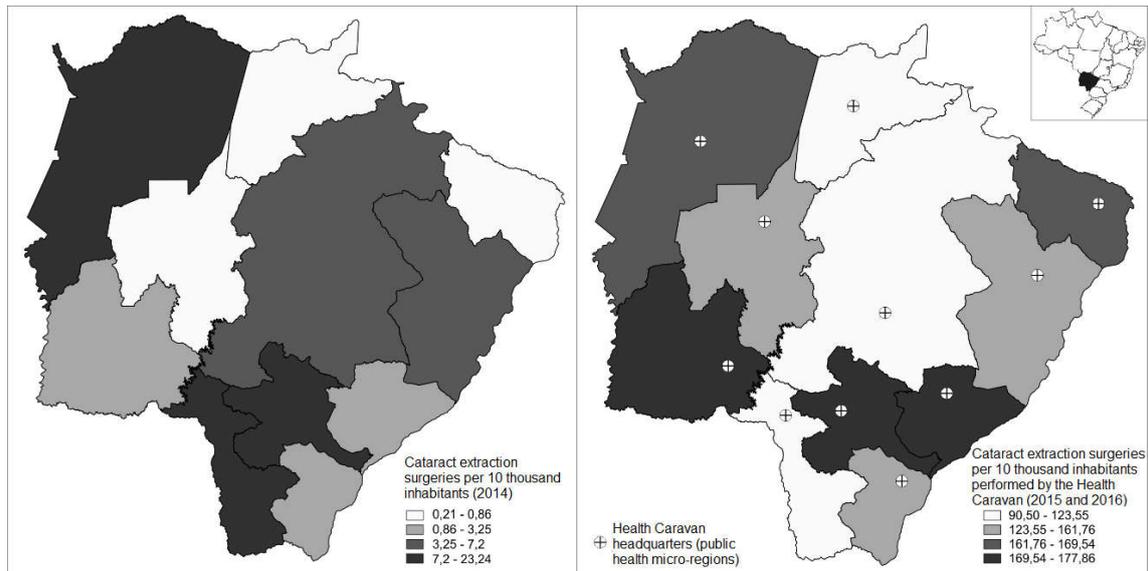


Figure 1. Distribution of cataract surgeries in the public health micro-regions of Mato Grosso do Sul in the years of 2014, 2015 and 2016

Table 1. Proportion of surgeries performed in relation to the estimated population with cataract over 40 years of age in the public health micro-regions of Mato Grosso do Sul, during the years of 2015 and 2016. Campo Grande - MS, 2018

Public health region	Estimated population >40 years of age with cataract	Total of surgeries performed	% of surgeries performed in the estimated population >40 years of age
Aquidauana	11.533	1.688	14.64
Campo Grande	99.962	13.486	13.94
Coxim	7.409	749	10.11
Jardim	8.767	1.775	20.25
Dourados	31.319	6.292	20.09
Naviraí	11.339	1.869	16.48
Nova Andradina	10.368	2.005	19.34
Ponta Porã	14.694	2.034	13.84
Paranaíba	9.606	1.548	16.12
Três Lagoas	14.996	2.877	19.19
Corumbá	10.415	2.193	21.06
Total	230.408	36.516	15.85

Table 2. Cataract extraction surgeries performed in Mato Grosso do Sul and Brazil, with the population older than 40, in the years of 2015 and 2016. Campo Grande - MS, 2018

Groups of age	Estimated population with cataract in MS	Cataract surgeries performed in MS		Estimated population with cataract in Brazil	Cataract surgeries performed in Brazil	
		No.	%		No.	%
40 to 64 years	126.627	11.010	8,70	4.895.906	233.829	4.78
65 to 74 years	53.867	16.574	30.77	4.923.867	336.812	6.84
75 years or more	49.914	8.932	17.89	9.906.702	217.725	2.20
Total	230.408	36.502	15.82	19.726.475	788.366	4.00

* MS: Mato Grosso do Sul

Sources: MS and Brazil population adjusted according to IBGE's population estimate of 2015 and proportion of people with cataract according to age through parameters recommended in the report of the Brazilian Council of Ophthalmology (CBO)⁴. The number of surgeries performed was extracted from the Department of Informatics of the Ministry of Health (DATASUS), using the outpatient information system (SIS) and the hospital information system (SIH)⁸ and the production reports of the Health Caravan Program of the State Department of Health of Mato Grosso do Sul, made available for study in Microsoft Excel version 16.0.

123.47 surgeries to 10,000 inhabitants older than 40. When comparing the estimated number of people with cataract in the country and the amount of surgeries performed with the information for Mato Grosso do Sul, it is possible to note an important increase in access to the procedure with the Health Caravan program, as shown in Table 2.

DISCUSSION

The Health Caravan Program increased the amount of surgeries performed by more than 500%. Figure 1 shows that the region with the highest number of surgeries went from 7.2 to 23.24 cataract surgeries per 10,000 inhabitants in 2014.

It is also shown in Figure 1 that the three regions with the least amount of surgeries performed throughout 2015 and 2016 presented a distribution of 90.50 to 123.55 procedures per 10,000 inhabitants. As expected due to vision impairment with aging, the number of surgeries performed was higher in the population older than 60, with 86.99% of the procedures occurring above this age group. The incidence of senile cataract tends to rise as a result of increased life expectancy. This situation can be reversed improving quality of life and increasing access to health services (Ramke *et al.*, 2017). However, the results of this research indicate that the population under 64 performed more surgeries than the population older than 75 years, in which a higher prevalence of

cataract is expected (CBO, 2018). With Health Caravan, comprehensiveness of the health service in Mato Grosso do Sul was increased. The number of surgeries uprose from 16.08 to 402.34 for every 10 thousand inhabitants over 40 years of age. Information from the Brazilian Council of Ophthalmology (CBO) indicates that there are still a number of people with impaired vision. Table 2 shows that, considering the estimation of people with cataract, the number of surgeries performed is still lower than expected, since the coverage reaches approximately only 15.85% of the estimated population with senile cataract. Brazil presents an accelerated rising of the elderly population, making its demographic profile similar to that of developed countries. However, Brazil is not prepared for the aging of its population, with a lack of organized and orientated services that causes disparities and inequalities (CBO, 2018). When analyzing the amount of cataract extractions in the state of Mato Grosso do Sul during the year prior to the program, a low coverage is noted, which is similar to the national coverage and insufficient for the demand. With the program, the coefficient of Mato Grosso do Sul surpassed the Brazilian index, indicating that it provided better access to the service. Cataract extraction is an important procedure that extends autonomy and quality of life in the affected elderly.

A study indicates that improving visual acuity positively affects the quality of life in elderly people, despite the inherent limitations of age (Paz *et al.*, 2018). Satisfaction and quality of life are increasingly deemed to be important indicators of overall health, with a significant impact on reducing health services' costs. The Action Plan for Preventing Blindness and Visual Impairment in Latin America lies within the scope of providing autonomy and quality of life and reducing the expenses of the health systems (Silva *et al.*, 2015) (SCHNEIDER *et al.*, 2018). Investments in health policies, according to specific needs such as cataract surgery, and in preventive actions are generally more effective than hospitalizations (Goel *et al.*, 2018). The surgical procedure performed in mobile units, when guaranteeing all aspects of patient safety, brings the service closer to those who need it, since the distribution of ophthalmology doctors and clinics is still disproportionate in the country (Gonçalves de Lima, Barbosa de Souza, 2005). The Health Caravan program is important for regions with low demographic density, such as the Midwest region of Brazil, due to its contribution on reducing geographical disparities in access to health services. The program is also compatible with one of the millennium development goals defined by the United Nations, aimed at coverage and equity of access to health services (WHO, 2014). Latin America has a significant degree of socioeconomic inequality and discrepancies in public health systems. In Brazil, where a unified health system financed by taxes was adopted, equity must be a foundation for health policy-making, therefore, the services must be organized in order to cover the target population as a whole (Atun *et al.*, 2015). Projections for 2020 indicate that the prevalence of preventable visual impairment is not sufficiently low to meet WHO's plan, since the health policies around the world are not following the demographic changes (Flaxman *et al.*, 2017). One of the strategies suggested by WHO is the expansion of equitable access focused on assistance for people and communities (PAHO, 2014). This strategy was used in the development of the Health Caravan program. In spite of the large number of surgeries performed during the years of 2016 and 2017, it is noted that there was no equity in the access to health services, when considering the number of procedures performed by

municipality/region of residence of the target population. These differences demand further studies focused on scheduling and locomotion processes that were established along with the municipalities (Giovannella *et al.*, 2018; Stopa *et al.*, 2017). The present study has some limitations. Since it is based on the program's reports, there may be some inconsistency regarding the data, especially immunicipality of residence. Another aspect that limits the study is the lack of information on queues. However, the estimates of elderly people in the regions allowed the assessing of the coefficients of procedures performed. It is very important to conduct further studies to identify the reasons that led people of younger age groups to have a greater participation in the cataract extraction service. This information is very relevant for developing health policies in this realm. Even with its limitations, investigation of access and coverage of health services through population-based studies is highly valuable for assessing health systems and proposing assertive policies.

Conclusion

The research findings point out that the Health Caravan Program has increased people's access to cataract extraction surgeries. The coefficients of execution of the procedure exceeded the average of the previous year in the state of Mato Grosso do Sul as well as the national average of Brazil. The program proved to be a good alternative for a demographically dispersed region to ensure people's access to the surgical procedure. The Health Caravan Program may be a good way to reduce inequities in access to health services, which is a goal of the Action Plan for Preventing Blindness and Visual Impairment. Even with wide coverage, it was observed that there still are differences in the distribution of procedures among regions. Such differences can be overcome with greater participation of the local managers of the health system and sharing responsibilities. Strategies for population displacement need to be built up to ensure equity of access, especially for older patients with mobility restrictions, since they compose the stratum most affected by cataract. It is important to encourage studies that capture information on the people who have been served by the program, in order to know better the limits and the scope of policies as described in this article.

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Conflicts of Interest: None

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