



Original Article

Rotator cuff repair in the Brazilian Unified Health System: Brazilian trends from 2003 to 2015[☆]



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ABSTRACT

Objective: To assess the historical trend of rotator cuff repairs in Brazil between 2003 and 2015, using the database of the Brazilian Unified Health System's (Sistema Único de Saúde [SUS]) Department of Informatics (DataSUS).

Methods: Historical series using DataSUS. Surgeries performed between 2003 and 2015 were included and data relating to cuff tear repair were assessed, including decompression procedures were included. The numerator was the total number of rotator cuff repair and the denominator, the total population of the assessed locality. Population data were based on information from the Instituto Brasileiro de Geografia e Estatística (IBGE).

Results: During the period, 50,207 surgeries were performed. The rate was presented as number of procedures per 100,000 inhabitants, and increased from 0.83 to 2.81, a growth of 238%. In 2015, the South region had the highest rate, 6.32, followed by the Southeast, 3.62, while the North had the lowest rate, 0.13. The growing trend can be observed in the Southeast, South, and Midwest, while the rate is stable in the North and Northeast.

Conclusion: The rate of rotator cuff repairs in Brazil performed through the SUS increased from 0.83 to 2.81 between 2003 and 2015, representing a growth of 238%, but remains lower than that of developed countries. A trend of growth can be observed in the Southeast, South, and Midwest, while the rate is stable in the North and Northeast.

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Reparo do manguito rotador no Sistema Único de Saúde: tendência brasileira de 2003 a 2015

R E S U M O

Palavras-chave:
Manguito rotador
Ombro
Saúde pública
Política de saúde

Objetivo: Avaliar a tendência histórica de reparos do manguito rotador no Brasil, entre 2003 e 2015, com o uso do banco de dados do Departamento de Informática do SUS (DataSUS).

Métodos: Série histórica com o uso do DataSUS. Foram incluídas cirurgias feitas entre 2003 e 2015 e coletados os dados referentes ao reparo de rotura do manguito, incluindo procedimentos descompressivos. Usamos como numerador o total de reparos do manguito rotador e como denominador a população total da localidade avaliada. Dados populacionais foram baseados nas informações do Instituto Brasileiro de Geografia e Estatística (IBGE). As taxas foram apresentadas por grupo de 100.000 habitantes.

Resultados: Durante o período, foram registradas 50.207 cirurgias. A taxa aumentou de 0,83 para 2,81, um acréscimo de 238%. Em 2015, a Região Sul apresentou a maior taxa, 6,32, seguida da Sudeste, 3,62, enquanto a Norte apresentou a menor taxa, 0,13. A tendência crescente pode ser observada nas regiões Sudeste, Sul e Centro-Oeste, enquanto o índice é estável nas regiões Norte e Nordeste.

Conclusão: A taxa de reparos do manguito rotador no Brasil feitos pelo Sistema Único de Saúde aumentou de 0,83 para 2,81 entre 2003 e 2015, um aumento de 238%, mas permanece inferior à dos países desenvolvidos. Uma tendência crescente pode ser observada nas regiões Sudeste, Sul e Centro-Oeste, enquanto a taxa é estável nas regiões Norte e Nordeste.

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Introduction

Shoulder pain has a high prevalence in the population, ranging from 7% to 26%.¹ Rotator cuff disorders, the main cause of pain in the shoulder girdle, affects 20% of the general population and up to 50% of individuals older than 80 years.² Rotator cuff repair is the main reason for shoulder surgery.³

This surgery provides satisfactory clinical results in more than 85% of patients.⁴⁻⁸ However, the trend of increase in the number of rotator cuff repairs, from 31% to 238% in published historical series,⁹⁻¹⁴ increases expenses of the healthcare system.¹⁴ Thus, it is necessary to outline the Brazilian panorama to determine public policies that best serve the population. In Brazil, there have been no evaluations of the number of surgeries performed for the repair of rotator cuff tears.

The primary objective of this study was to evaluate the historical trend of rotator cuff repairs performed by the Brazilian Public Health System (Sistema Único de Saúde [SUS]) between 2003 and 2015, using the database of the Department of Information Technology of SUS (DataSUS). The secondary objective was to describe the rate of accredited services and associate members of the Brazilian Society of Shoulder and Elbow Surgery (Sociedade Brasileira de Cirurgia do Ombro e Cotovelo [SBCOC]) by region in 2015 and to correlate this data with that of the rates of surgeries.

Methods

A historical series was made using the database of the DataSUS, an agency of the Department of Strategic and

Participatory Management of the Ministry of Health responsible for collecting, processing, and disseminating health information. All data collected are freely available on the DataSUS website.¹⁵ Surgeries performed between 2003 and 2015 were included, and data for the cuff tear repair procedure, including decompression procedures, were collected. This study was approved by the institution's Research Ethics Committee under No. 1193.

The primary objective of the study was to describe the incidence of rotator cuff repairs per 100,000 inhabitants/year, in national terms and stratified by region and state of the federation. The data were stratified by year, from 2003 to 2015. To calculate the incidence, the total number of rotator cuff repairs was used as numerator; the total national population, region, or state for the period studied was used as the denominator. Population data from the 2010 National Census were collected on the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística [IBGE]) website,¹⁶ as well as the population projections for the remaining years.¹⁷ The rate of accredited services and associate members of SBCOC was based on the information from the Society's website,¹⁸ and confirmed by the official sector. For this analysis, the denominator used was the population in 2015 and the rates were presented per 10,000,000 inhabitants.

Statistical analysis

The number of rotator cuff repairs was presented in absolute values and percentage, for Brazil and for the different regions and states, as well as for the year of the surgery. The rate of surgeries was presented per 100,000 inhabitants. The rate of accredited services and associate members of the SBCOC

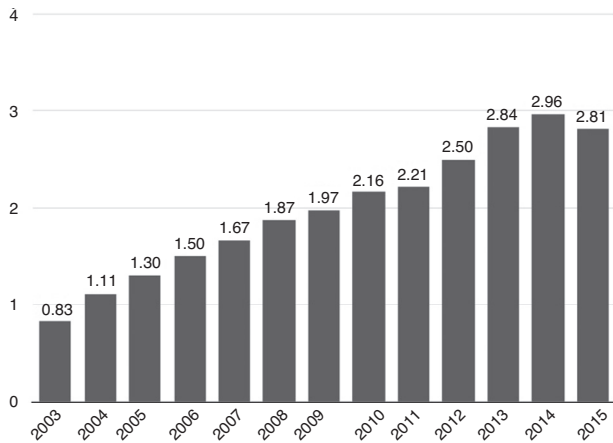


Fig. 1 – Rates of rotator cuff repairs performed in the Brazilian Public Health System from 2003 to 2015 (per 100,000 inhabitants).

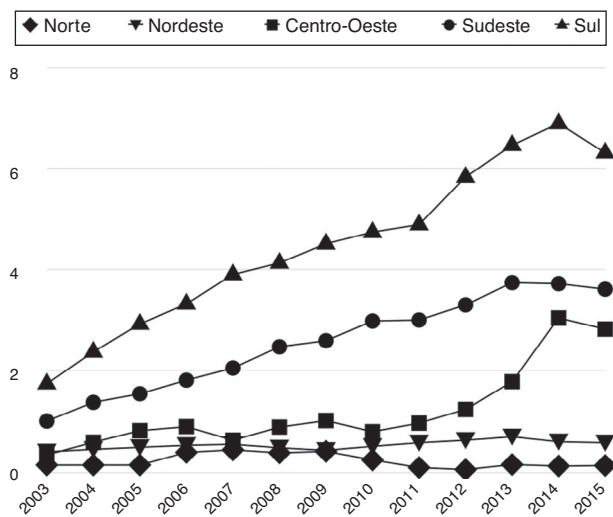


Fig. 2 – Rates of rotator cuff repairs performed in the Brazilian Public Health System, per region, from 2003 to 2015 (per 100,000 inhabitants).

was presented per 10,000,000 inhabitants. The incidence was based on the analysis of the entire Brazilian population; it was not necessary to calculate the confidence interval.

Results

During the 13 years included in the study, 50,207 rotator cuff repairs were performed and registered in the SUS. The rate of procedures per 100,000 inhabitants rose from 0.83 to 2.81 in the period, an increase of 238% (Fig. 1).

In 2015, the highest rate of surgeries was observed in the South region (6.32 procedures/100,000 inhabitants), followed by the Southeast, with 3.62. In turn, the North region presented the lowest rate, 0.13. A trend of increase could be observed in the Southeast, South, and Mid-West regions, while the rate was stable in the North and Northeast regions (Fig. 2).

Table 1 presents the historical data on rotator cuff repair rates per state from 2003 to 2015. The complete set of data,

including the absolute number of surgeries and the population of the state and region in each year, are shown in the Supplementary Table, available on the online version. In 2015, the states with the highest rates of rotator cuff repair were Espírito Santo (11.96), Rio Grande do Sul (8.95), Paraná (4.87), and Santa Catarina (4.36). All states in the Northeast region, except for Piauí, and all those in the North region presented rates lower than one surgery per 100,000 inhabitants in 2015.

Table 2 presents the rate of accredited services and associate members of SBCOC in 2015 per 10,000,000 inhabitants.

Discussion

The analysis of the national database showed that, as in other countries, there is a trend of increase in the number of rotator cuff repairs performed in Brazil, with a 238% increase in the period studied. This percentage is similar to that reported by Ensor et al.¹³ in the state of New York between 1995 and 2009, and higher than the other assessed studies, which reported increases between 31% and 204%.^{9,10,12,14} However, the rate of procedures performed by SUS is lower than in other countries. The rate of surgeries per 100,000 inhabitants increased from 0.83 in 2002 to 2.81 in 2015. In the United States, Colvin et al.¹⁹ demonstrated that this rate increased from 41 to 98/100,000 inhabitants between 1996 and 2006. In England, Judge et al.¹¹ reported a rate of 6.3/100,000 inhabitants in 2009–2010. In Finland, Paloneva et al.¹⁰ reported an increase in the rate, from 44 to 131 per 100,000 inhabitants between 1998 and 2011, but only when using the population over 18 years as the denominator. Studies conducted in the United States using state databases^{13,14} including patients undergoing outpatient surgery³ or subgroups of patients with health insurance¹² also demonstrated increasing trends, but with higher rotator cuff repair rates than those of SUS. Unfortunately, no studies with a large population sample in developing countries were retrieved to compare the present data with an economic and social reality similar to that of Brazil.

The authors believe that the low rate of surgeries registered in Brazil when compared to developed countries is due to a number of factors. The first factor may be underreporting, as some states did not record rotator cuff repair surgery in certain years. Furthermore, the Brazilian population is undergoing an aging process, which has already occurred in developed countries.²⁰ As rotator cuff disorders are age-related,² a population with a lower proportion of older people is expected to present a lower incidence of rotator cuff repair surgeries. Brazil also has remote areas that lack medical assistance, as well as the economic scenario typical of developing countries, which suggests that some patients may not receive the entire recommended treatment.

The Brazilian regions that did not present significant increases in surgery rates, the North and Northeast, have the lowest rates of accredited services and associated members, considering the population in 2015.^{17,18} The authors believe that improving the distribution of shoulder surgeons in the country and increasing the number of accredited services in regions with lower surgical rates may lead to better care of the population.

Table 1 – Rotator cuff repair rates in the Brazilian Public Health System, per state, from 2003 to 2015 (per 100,000 inhabitants).

State/region	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Acre	0.16	0.00	0.00	0.15	0.00	0.71	0.14	0.82	0.94	0.00	0.00	0.25	0.37
Amapá	0.00	0.00	0.00	0.00	0.00	0.31	0.00	0.15	0.00	0.00	0.41	0.13	0.78
Amazonas	0.10	0.19	0.34	0.30	0.12	0.40	0.31	0.23	0.03	0.08	0.13	0.08	0.13
Pará	0.15	0.13	0.09	0.45	0.74	0.42	0.57	0.28	0.06	0.03	0.13	0.14	0.09
Rondônia	0.07	0.00	0.00	0.06	0.00	0.12	0.00	0.06	0.12	0.06	0.12	0.00	0.00
Roraima	0.00	0.00	0.00	0.72	0.00	0.23	0.00	0.00	0.00	0.21	0.41	0.40	0.20
Tocantins	0.40	0.47	0.15	0.90	0.66	0.29	0.72	0.07	0.00	0.14	0.27	0.13	0.07
North region	0.14	0.14	0.14	0.39	0.44	0.38	0.41	0.24	0.09	0.05	0.15	0.12	0.13
Alagoas	0.00	0.10	0.03	0.13	0.32	0.28	0.31	0.19	0.34	0.12	0.03	0.06	0.03
Bahia	0.44	0.44	0.73	0.77	0.78	0.71	0.68	0.99	1.16	1.41	1.32	0.96	0.87
Ceará	0.26	0.26	0.38	0.38	0.40	0.40	0.25	0.37	0.31	0.41	0.59	0.43	0.61
Maranhão	0.13	0.08	0.14	0.17	0.25	0.17	0.02	0.11	0.30	0.22	0.25	0.32	0.29
Paraíba	1.51	1.44	0.69	0.79	1.37	0.99	1.03	0.64	0.16	0.33	1.33	2.03	0.65
Pernambuco	0.24	0.29	0.42	0.42	0.26	0.34	0.18	0.27	0.42	0.28	0.28	0.23	0.36
Piauí	0.24	0.80	0.36	0.62	0.19	0.68	1.18	1.03	1.08	1.04	1.16	0.56	1.31
Rio Grande do Norte	0.74	0.89	0.98	0.64	0.35	0.06	0.19	0.16	0.03	0.00	0.03	0.06	0.00
Sergipe	0.36	0.56	0.45	0.90	1.37	0.53	0.05	0.05	0.33	0.46	0.32	0.45	0.94
Northeast region	0.40	0.45	0.49	0.53	0.55	0.48	0.43	0.51	0.58	0.63	0.70	0.60	0.58
Distrito Federal	0.67	1.23	1.55	2.19	1.03	0.93	1.57	1.87	1.91	2.86	3.19	2.87	2.74
Goiás	0.17	0.42	0.85	0.56	0.22	0.72	0.87	0.62	0.78	0.68	1.88	4.40	3.59
Mato Grosso	0.37	0.58	0.46	0.45	0.72	0.68	0.63	0.33	0.39	0.70	0.28	0.40	1.10
Mato Grosso do Sul	0.40	0.40	0.43	0.98	1.13	1.53	1.31	0.69	1.15	1.57	1.89	3.13	3.17
Mid-West region	0.34	0.59	0.82	0.90	0.63	0.89	1.02	0.80	0.97	1.24	1.79	3.05	2.83
Espírito Santo	0.57	0.79	0.58	0.69	1.24	1.19	0.03	0.37	1.28	4.80	9.66	10.48	11.96
Minas Gerais	0.90	1.16	1.21	1.21	1.25	2.46	2.34	2.64	2.67	3.21	3.57	3.07	2.80
Rio de Janeiro	0.85	1.30	1.41	1.91	1.96	1.44	1.93	1.45	2.24	2.78	3.13	3.37	3.46
São Paulo	1.16	1.56	1.85	2.17	2.55	2.99	3.19	3.98	3.60	3.42	3.54	3.59	3.33
Southeast region	1.01	1.38	1.55	1.82	2.06	2.48	2.60	2.99	3.01	3.31	3.75	3.73	3.62
Paraná	2.19	2.75	3.07	2.92	3.90	4.13	5.27	4.23	4.29	5.88	5.14	4.52	4.87
Rio Grande do Sul	1.44	2.00	2.92	4.04	4.20	4.43	4.03	5.05	5.82	5.93	8.43	10.23	8.95
Santa Catarina	1.54	2.43	2.68	2.76	3.39	3.65	4.11	5.12	4.34	5.63	5.40	5.29	4.36
South region	1.75	2.38	2.93	3.33	3.91	4.14	4.52	4.75	4.90	5.84	6.47	6.90	6.32
Brazil	0.83	1.11	1.30	1.50	1.67	1.87	1.97	2.16	2.21	2.50	2.84	2.96	2.81

Bold lines that inform the rate of surgeries by region and the total of the entire country. The others that represent the states are not in bold. Bold indicates the totals of the regions of Brazil.

Table 2 – Rate of accredited services and associated members of the Brazilian Society of Shoulder and Elbow Surgery (Sociedade Brasileira de Cirurgia do Ombro e Cotovelo [SBCOC]) per Brazilian region in 2015 (per 10,000,000 inhabitants).

Region	SBCOC accredited services	Associated members SBCOC
North	0	10.87
Northeast	0.35	19.98
Mid-West	1.3	41.44
Southeast	1.98	59.25
South	1.71	44.82

The present study has some limitations. The authors chose to exclude the initial period available in the database (from 1992 to 2002). The number of surgeries performed in Brazil, according to DataSUS, ranged from 76 to 251 per year in the excluded period. From that date onwards, the numbers were closer to the reality. The authors attribute this to a possible collection bias. It is noteworthy that the analysis considered where surgery took place, not where the patient dwells. The intention behind this strategy was to assess the importance of each state in the total surgical volume.

The DataSUS database does not include patients covered by supplementary health care. Approximately 25% of the Brazilian population has access to some kind of health insurance, according to data on the website of the National Supplementary Health Agency (Agência Nacional de Saúde Suplementar [ANS]).²¹ That entity does not have a database available to the public regarding the number of rotator cuff repairs. As only 75% of the Brazilian population depends exclusively on the Unified Health System, this results in a collection bias that underestimates the rates of surgical procedures performed in Brazil. However, the authors believe that even when adding these data, the Brazilian rates would remain significantly lower than those of the developed countries. Another limitation of the database is that it does not differentiate between open and arthroscopic procedures, as explained by some authors,^{9,10,12,14} as well as between traumatic or non-traumatic injuries, and between complete or partial thickness. Procedures related to the long head of the biceps tendon were also not assessed, since the database does not specifically contemplate this tendon. More detailed data collection and processing by DataSUS could improve healthcare indicators and allow for more in-depth studies.

As favorable points, it is noteworthy that, to the best of the authors' knowledge, this is the first Brazilian population study to assess the incidence of rotator cuff repairs and the first to use the DataSUS database in orthopedics. In addition, it has shown that the rate of surgeries in Brazil is lower than that of developed countries. Thus, despite the possible collection biases, the authors believe that a large part of the population remains unassisted in relation to this prevalent clinical condition. The authors believe that this study can guide SUS actions in regard to continuing medical education programs and better distribution of resources.

Conclusions

In Brazil, the rate of rotator cuff repairs performed by SUS per 100,000 inhabitants increased from 0.83 to 2.81 between 2003 and 2015, an increase of 238%. The South region presented the highest rate of surgeries, 6.32, followed by the Southeast, with 3.62. In turn, the North region presented the lowest rate, 0.13. The increasing rate of procedures trend could be observed in the Southeast, South, and Mid-West regions, while the rate was stable in the North and Northeast regions. The regions with lower rotator cuff repair rates, North and Northeast, have the lowest rates of accredited services and associated members of the Brazilian Society of Shoulder and Elbow Surgery.

Conflicts of interest

The authors declare no conflicts of interest.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.rboe.2017.06.010.

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