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REVIEW

Advances in rheumatology practice in Brazil

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Abstract
Despite resilient inequities, Brazil has seen progressive improvement in health care in the last 25 years. Infectious diseases rendered place to chronic non-communicable diseases as a major cause of death. Existence of traditional schools of medicine and training services in rheumatology helped form a reasonable number of specialists, though irregular distribution due to the economic issues favoring their clustering in major cities. The Brazilian Society of Rheumatology provides continued medical education, helps training rheumatologists, family physicians and other health professionals and has worked to publish national recommendations for the diagnosis and treatment of major rheumatic diseases. Access to medications and health care facilities is provided for most patients, free of direct charge, including biologics. Specialized services for autoimmune and rare diseases, including pediatric rheumatology and autoinflammatory diseases, have improved, particularly in developed centers of the southern best developed parts of the country. A major unmet need is the lack of access to non-pharmacological treatment modalities. In this article, we will summarize some of the strengths and points that need improvement to enhance access to the rheumatological health care in Brazil.

Keywords Arthritis · Disease burden · Rheumatology · Epidemiology

Introduction

In the last 20 years, demographic and economic changes have modified the prevalence of communicable diseases in Brazil. A recent compilation showed that digestive and upper respiratory tract infections rank as first and second major causes of years of life lost (YLL) followed by neonatal preterm birth in 1990 that gave space to ischemic heart disease, interpersonal violence and road injuries as the three major causes of YLL in 2016. Curiously, low back and neck pain ranked first in 1990 and remained the major cause of years lost with disability (YLD) in 2016 in Brazil [1]. Notwithstanding, diseases classified as other musculoskeletal disorders (OMD) that were previously defined as encompassing systemic lupus erythematosus, ankylosing spondylitis, and psoriatic arthritis, together with joint, ligament, tendon or muscle problems, including shoulder problems persisted among the ten most common causes of YLD from 1990 to 2016 in Brazil [1–3]. Given the low prevalence of the three inflammatory diseases included among OMD, it appears that back pain and soft tissue rheumatisms are the resilient major components as a cause of YLD in Brazil.

Rheumatologists are usually more concerned over treatment for autoimmune diseases rather than over apparently "less serious" illnesses, which is reasonable. Difficulties in correctly diagnosing and managing autoimmune diseases are associated with tissue damage and reduced life expectancy. It can also be assumed that health authorities, and physicians in general, will agree that patients affected by rheumatic autoimmune disorders, such as rheumatoid arthritis, are better treated with rheumatologists [4]. However, given the lack of specialists, not to mention rheumatologists' own lack of interest, we will probably find it hard to accept that disorders classified as soft tissue rheumatisms, including fibromyalgia, by far more prevalent than any of the autoimmune diseases, deserve the same special attention. In addition to a lack of rheumatologists, the numbers shown in the Global Disease Burden project suggest that better access to specialists already in the field could mean significant improvement in public health. It would not only improve disease

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management, but also participation in medical education for nurses, physiotherapists, family physicians, and general practitioners. As a result, one would expect improvement in correctly diagnosing and helping treat patients classified as presenting OMD [3].

Data collected in Brazil mimic the increase in the Global Burden of Musculoskeletal diseases worldwide, which has risen from 1990 to 2010. Increase in life expectancy, sedentarism, and obesity as well as decrease in communicable diseases in developing countries, will only render chronic incapacitating diseases more prevalent. This should call attention to health authorities and people in general, which will be the most benefited with improvements in musculoskeletal health care [1, 2].

Inequities seen worldwide are replicated within regions and countries [5, 6]. Thus, attempts to report data on health across Latin-America as reflecting local situations can be flawed by geographic, ethnic, and economic singularities among countries in this subcontinent that spans more than 60° latitude [7, 8]. Lack of accurate data in developing countries renders comparisons even harder to be made. This also holds true when trying to analyze data from large countries, like Brazil. Be as it may, despite some variation, the impact of diseases on YLD, displaying rheumatologic diseases as major causes, remained relatively stable from 1990 to 2010 throughout the five regions in Brazil [1].

Our aim is to provide an overview concerning the practice of rheumatology in Brazil including access to health care and rheumatology services. The authors are responsible for the opinions expressed in the text, which do not necessarily reflect those of the Brazilian Society of Rheumatology or public institutions in Brazil. We searched MEDLINE and SciELO, with no data restrictions for English language articles, but some Portuguese language articles were considered, using these keywords: Arboviruses, Biosimilars, Brazil, Fibromyalgia, Gout, Lupus, Non-pharmacological treatment, Osteoarthritis, Osteoporosis, Physiotherapy, Prevalence, Rheumatic diseases, Rheumatoid arthritis, Rheumatologists, Rheumatology, Scleroderma, Spondyloarthritis, Soft tissue rheumatism, Tuberculosis, Vaccines, and Vasculitis. Data from public official Institutions in Brazil were also searched. As reported in articles commenting on the situation in other developing countries, there is a lack of properly collected data [9, 10]. Whenever possible, we will specifically address differences concerning the less (northern) and more (southern) developed regions of this country.

Rheumatoid arthritis

Prevalence of rheumatoid arthritis (RA) in Brazil has not been extensively studied. A survey using the COPCORD approach reported in 2003 gave an estimation of 0.46% prevalence (95% CI 0.25–0.77), with a 13:1 female to male ratio. Among the patients examined, 71.4 referred moderate to very severe pain, with a 6.14 mean value in a 0–10 visual analog pain scale. Most patients had joint limitation and only 35.7% were seen by a rheumatologist, reflecting the difficulty in access to a specialist [11].

Following the introduction of biologic compounds to treat RA, the Brazilian Society of Rheumatology (BSR) settled a registry, called Registro Brasileiro de Monitoração de Terapias Biológicas (BIOBADABRASIL), in cooperation with the Spanish Registry for Adverse Events of Biological Therapy in Rheumatic Diseases (BIOBADASER), to collect data on patients with rheumatic diseases treated with biologic compounds in 35 hospital centers throughout Brazil [12]. The two most recent publications focused on drug survival and incidence of tuberculosis in patients receiving biologics, including data from over 1250 patients, comprising more than 1500 treatments [13, 14]. Although public health system is responsible for financing the majority of the treatments, there are no precise data available. Since there is neither penalty nor compensation for data entering and few institutions have adequate personnel for that work, most patients are not included. Still, BIOBADABRASIL has a relatively proportional distribution of patients from every of the five Brazilian regions, providing a rather homogeneous and realistic data bank on the use of biologics [13, 14]. Access to a specialist is a major problem, but high cost medications are being offered at no direct cost to the patient, under rheumatologist's scrutiny, since 2004. Data from BIOBADABRASIL reveal that disease-modifying antirheumatic drugs (DMARD) were used by 92.6% of 931 RA patients, including 72.2% on methotrexate, which is close to the 72.4% that were also using glucocorticoids [14]. Another recent study on a real-life survey focusing on 1115 RA patients in Brazil found that 35.7% were using biologics, as compared to 96.5% using nonbiological DMARD, either isolated or combined. Glucocorticoids were being used by 47.4% of those patients and 9.1% were on nonsteroidal anti-inflammatory drugs (NSAID). Methotrexate was used by 66.5% of the patients and only 5.6% were on biologic monotherapy. Among those patients, 26.2% were considered on remission and 15.1% in low disease activity, meaning 41.3% that could be considered as achieving treatment target. Although 12 months was the median time from symptoms to the start of first DMARD, the range was large, varying from 1 to 624 months, revealing disparity in access to treatment [15]. Due to increasing costs and the introduction of biosimilars, a technical note was recently implemented by the Ministry of Health stating that the first biologic DMARD in RA should be chosen among adalimumab, certolizumab or infliximab, considered better cost-effective. However, other compounds can be otherwise indicated as a first choice, provided a justification is made. After failure of a biologic or in the case of

adverse events, any other biologic compound can be implemented [16].

Recommendations for RA treatment from BSR were updated in 2015, and call attention to the difficulty in access to rheumatologists, emphasizing discrepancies across regions as a result of economic inequities. Physicians are strongly recommended to search for infectious diseases, not only as a comorbidity, but also because they can mimic immunomediated diseases [17]. Public health authorities have taken into account treatment recommendations of the BSR, particularly on RA treatment, reflecting BSR worries to provide the best cost-effective approach. BSR has also pointed that access to non-pharmacologic, rehabilitating facilities, is far from ideal in Brazil [17]. The economic impact of RA current treatment evaluated in one state in Brazil revealed a reduction in the number of clinical and surgical admissions of those patients from 1996 to 2009, with increasing costs due to the pharmacological treatment [18].

Spondyloarthritis

Brazil is home to a national registry called RBE (Brazilian Registry of Spondyloarthritis), which is part of the RESPONDIA group and captures data from 29 rheumatology centers in Brazil [19]. Similar to BIOBADABRASIL, it is also not a compulsory registry but captured patients from all five regions of the country. A recent publication on 1318 patients from RBE data bank included 65% of White people, 31.3% African-Brazilians, and 3.7% of other race classifications with a 2.6:1 male to female ratio for the whole group. Ankylosing spondylitis accounted for 65% of the patients, followed by psoriatic arthritis (18.3%), undifferentiated spondyloarthritis (6.8%), enteropathic (3.7%), and 3.4% reactive arthritis. Interestingly, HLA-B27 was positive in 72.8%, 62.4%, and 35% of White people, African descendants, and those of other ethnicities, respectively, meaning a significant difference regarding HLA-B27 positivity across Brazilian patients with spondyloarthritis [19, 20]. African-Brazilians performed significantly worse in the Ankylosing Spondylitis Quality of Life score with no apparent relation to personal income [21]. Among those 1318 patients, NSAID was being used by 68%. Also, 44.8% and 52.2% were on sulphasalazine and methotrexate, respectively, 26% were on biologics, including 63% using infliximab [20]. However, the 2012 data were not updated and the use of anti-TNF compounds other than infliximab increased. Psoriatic arthritis, which is considered more common in White people, appears to be less prevalent in Brazil, as compared to Argentina, which has a higher predominance of western European descendants [22]. However, a cross-sectional study in psoriasis patients found a significant percentage of patients that met the Classification Criteria for Psoriatic Arthritis (CASPAR) criteria. This is similar to what has been reported in other scenarios, indicating that psoriatic arthritis may be underdiagnosed, an issue that may increase its burden [23]. In fact, a study conducted in São Paulo found an increase in prevalence of cardiovascular comorbidity among patients with psoriatic arthritis [24]. Clinical presentation of spondyloarthritis revealed a slight though significantly increased prevalence of enthesitis, peripheral arthritis, and hip involvement in patients from Latin America, including Brazilian patients. A lower prevalence of HLA-B27 was found in patients from the north region, where the rain forest is located, which received less Europeans, as compared to the rest of the country. We should remark that this phenotype was not present in pre-Colombian Americans. Whether this also influences disease phenotype is yet to be shown [20–22].

Recommendations for diagnosis and treatment of ankylosing spondylitis and psoriatic arthritis in Brazil parallel international guidelines and were updated in 2013 [25, 26]. Brazilian rheumatologists do also take part in international organizations including the Assessment of Spondylitis International Society (ASAS) and the Group for Research and Assessment for Psoriasis and Psoriatic Arthritis (GRAPPA) associations, as a way of improving knowledge and establishing collaborations with foreign investigators in the field.

Gout

A recent protocol in gout was created in Brazil, under partial support of BSR, which intends to draw the profile of gout patients. Preliminary data from 13 centers comprised 469 patients being 93% males of 61 years old median age and 14 years median disease duration. Tophi were present in 45% of the sample, 28% had a history of kidney stones, 77% were hypertensive, 28% diabetic, 25% had metabolic syndrome, and chronic kidney disease was present in 19% of the sample. Over 50% of the patients reported acute gout attacks in the 12 month period prior to the interview even though the majority had serum uric acid level reaching therapeutic target. Allopurinol (255 mg/day mean dose) was being used by 80% and 11% were using benzbromarone. Those unpublished data mirror a recent study detailing the perception of gout treatment among Brazilian rheumatology residents [27]. A revision of the current treatment of gout among Brazilian rheumatologists was recently published [28]. Strange as it may seem, there are no gout medications available in the public health system but NSAID. Commonly, diagnosis is based on clinical suspicion and conventional radiography and it is not common to order synovial fluid analysis for crystals except for training rheumatology services.

Scleroderma and systemic lupus erythematosus

Similar to RBE, a national protocol was conducted between 2003 and 2006 collecting data in systemic sclerosis (SS) called Grupo de Esclerose Sistêmica do Projeto Pró-nuclear (GEPRO). This group involved 28 university centers that collected data from 1139 SS patients, comprising 508 (44.6%) classified as limited SS, 504 (44.2%) as diffuse SS, 73 (6.4%) considered overlap syndromes, and 54 (4.8%) SS variant, sine scleroderma. Females (996; 87.4%) were predominant and 740 (65%) were classified as White Caucasians. A more detailed description was reported in a review article on SS registries, but no specific publication from GEPRO appeared so far. It is worth mentioning that males and patients that classified themselves as of African-Brazilian ethnicity appeared to have worse prognosis. Also, those classified as diffuse SS and the presence of anti-Scl-70 antibodies were associated with disease severity [29].

Brazilian rheumatologists take part in the Latin American Group for the Study of Lupus (GLADEL, Grupo Latino Americano de Estudio del Lupus)-Pan-American League of Associations of Rheumatology (PANLAR). That group has recently published clinical practice guidelines approaching particular needs of patients living in that region [30]. A multicenter study collected data from 1555 childhood-onset systemic lupus erythematosus patients, across 27 pediatric rheumatology centers in the country, revealing a delay in diagnosis and a severe clinical picture [31].

Osteoarthritis, osteoporosis, and fibromialgia

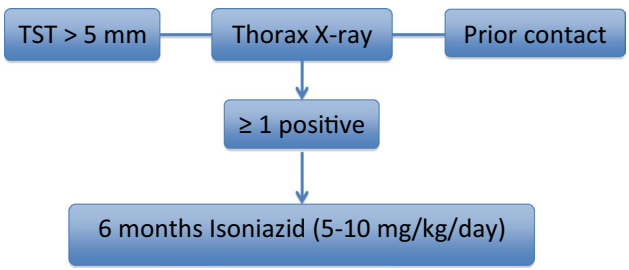
The COPCORD study, in a cohort of 3038 interviewed patients, obtained 4.14% (95% CI 3.46–4.91) prevalence of osteoarthritis (OA) in the general population. Spine involvement ranked first as the affected site, followed by the knees, hands and hips. Multiple involvement was referred in 21.4% of the persons interviewed [11]. Over 50% of the OA patients reported past or present limitation and only 10.3% were seen by a rheumatologist [11]. NSAIDs but not coxibs are easily available without a prescription in pharmacies, at a very low cost. With a medical prescription, people have access to ibuprofen, sodium diclofenac, and naproxen in the public health system at no cost. Glucosamine sulfate plus chondroitin sulfate are probably the most prescribed medications for OA by physicians in Brazil, particularly for knee and hip OA. Over-the-counter formulations containing oral collagen have also become popular. Other compounds including diacerhein, avocado/soybean unsaponifiables, and hydroxychloroquine are also prescribed, particularly by rheumatologists [32, 33]. Unfortunately, access to physiotherapy, rehabilitation facilities or recreational activities are a major unmet need in OA treatment.

There are reports suggesting that osteoporotic fractures are less prevalent in Brazil, as compared to data from Caucasians particularly in the low latitude northern regions of the country, where there are less European descendants [34, 35]. The public health system provides calcium, vitamin D supplementation, and alendronate. The diagnostic work-up in the public system includes bone densitometry and radiographies [36].

The fibromyalgia committee of BSR has recently published updated diagnostic recommendations on this disease [37] and a national registry was recently launched [38].

Infectious diseases and vaccines

Despite a decrease in prevalence, tuberculosis is still frequent in Brazil [39]. The introduction of biologics to treat chronic arthritis in Brazil prompted the recommendation of a proactive search for latent tuberculosis, prior to starting treatment. Recommendations of the Ministry of Health are followed and include detailed clinical history trying to identify real or potential exposure to contaminant patients. Thorax radiography and tuberculin skin test are mandatory. Those with a higher than 5 mm response in tuberculin test and/or a thorax radiography showing untreated pulmonary tuberculosis sequelae, particularly fibrotic lesions in the upper lobes, are subjected to isoniazid prophylaxis (5–10 mg/kg/day up to 300 mg/day) for 6 months. If there is a history of contact with an infected individual, prophylaxis may be introduced regardless of tuberculin test result, as it was shown that RA patients may have a decreased response, as compared to healthy controls (Fig. 1). Those



Tuberculous skin test, TST; Thorax radiography, Thorax X-ray

Fig. 1 Screening for tuberculosis

with positive radiography suggesting active disease are subjected to treatment and, when inconclusive, referencing to an infectious disease service is recommended. An interferon gamma release assay can be used when tuberculin skin test is unavailable. Patients should be examined by the prescribing physician at least every 3 months. Tuberculin skin test or imaging may be repeated if a change in the protocol is made or under physician's scrutiny [39, 40]. Probably because of that strategy, we have not seen a major increase in the occurrence of tuberculosis. Data from BIOBADABRASIL shows that among 1552 patients receiving anti-tumor necrosis factor compound followed from 2009 to 2013, the incidence rate of tuberculosis was 1.01/1000 patient-years in the controls and 2.87 patient-years among anti-TNF users with a mean drug exposure time until the occurrence of tuberculosis of 27(11) months for the anti-TNF group. This later occurrence suggested that screening procedures prevented tuberculosis that may indeed appear during treatment [14].

In recent years, outbreaks of arbovirus infections occurred in the Americas, including Brazil [41–43]. In this regard, joint manifestations following the initial phase may be prominent and persistent in patients infected with Chikungunya virus [42, 43]. Recommendations from BSR both on diagnosis and management of post-Chikungunya arthritis were published [44, 45].

Biosimilars

Biologic compounds represent a major part of the public budget directioned to rheumatic diseases management. The introduction of biosimilars was seen as a major opportunity to lower costs, both to public and private services. Actually, since a variety of those compounds are used to treat RA, prices have already steadily declined, as compared to their early days. However, access of more patients impaired lowering the total expenditure on biologics. It is hard to present exact data given the various stakeholders involved. The legislation for biosimilars in Brazil mirrors that of the European Union agency so that compounds have to demonstrate comparability to the innovative product based on a full preclinical study, a phase I study and at least one phase III study with adequate numbers to prove non-inferiority. This issue has been extensively discussed with the participation of members of BSR as contributors to the official agencies. At this moment, there is just one anti-TNF biosimilar on the market. Extrapolation of indications is accepted and we expect the introduction of several of those biosimilar compounds in the forthcoming years. Recommendations on the use of biosimilars with the BSR participation have been published [46].

Manpower, research, and training

Using 2015 data, there are 49 registered accredited rheumatology training services in Brazil with 120 new residents yearly [47]. Currently, there are 1165 board-certified rheumatologists in the country [48]. The distribution of rheumatologists in Brazil parallels the economic inequities of the country. A survey conducted in Brazilian official databases reported a clustering of rheumatologists to major cities, particularly state capitals. There is a a large variation across regions so that the proportion of inhabitants/rheumatologist is 370,867, 157,160, and 91,827 in the north, southeast, and south regions, respectively. Within the regions and states, this variation is reproduced, with a concentration in large cities. Availability of specialized rheumatology centers, most of them linked to medical education, reflects the same concentration, so that residency training and postgraduating programs are in the vast majority concentrated in the southern regions [48, 49]. Access to professionals on data analysis (statistics) as well as access to continuing medical education has been rendered easier in part due to BSR support. There are many public and private resources to conduct industry-sponsored protocols in Brazil, so that anyone aiming to conduct a clinical protocol is able to gather all information and resources needed. Several pivotal worldwide studies done in the past 20 years in rheumatology included patients from Brazilian centers contributing to a network of well-trained personnel and facilities to perform clinical studies. In some public institutions, funding obtaining by conducting industry-sponsored protocols help maintain professionals that do also participate in projects of their own interest. The official BSR website provides information both for patients and physicians, supplying booklets, leaflets and folders. There is a BSR compromise to provide adequate information, so that specialists commonly participate in meetings with public-run associations. Continuing medical education, meaning instructions for clinical examination and laboratory work-up as well as adequate referral to a rheumatologist can be found in BSR website [50]. There is also a committee on the standardization of reading of antinuclear antibody tests sponsored by BSR, aiming to homogenize interpretation of immunofluorescence results in the various laboratories, including private services, in the country. Actually, Brazilian rheumatologists actively participate in the International Consensus on antinuclear antibodies detection and interpretation [51–55]. There is also continuing medication on imaging interpretation, usually with hands-on training pre-meeting courses in BSR annual meetings. Most rheumatologists are board-certified on annual exams, with participation of examiners from all regions. It includes both theoretical and

practical skills evaluations, on a 2-day test. Whether or not a Brazilian rheumatologist is board-certified can be seen in the BSR website and it is mandatory for participation in BSR committees [50].

Funding for science is a problem in any developing country and Brazil is no exception. There are official agencies to support both basic and clinical research. Access is on a competitive basis, with defined rules for researchers, institutions, and merit (relevance) of the project. The major funding agency is CNPQ, but we should also quote FAPESP, an agency that sponsors professionals working in the State of São Paulo. All relevant information can be obtained in the official website of those agencies [56, 57]. Other states do also have agencies, but their relevance to project funding is low. Their main support is to provide scholarships for graduating and postgraduating students, meaning indirect benefit to research development. BSR also does launches and sponsors research initiatives. Elaboration of systematic reviews to provide state-of-the art data for the elaboration of recommendations on diagnosis and treatment of rheumatic diseases is a major example. Rheumatologists can propose individual or joint research projects for unrestricted BSR financing. Those are peer-reviewed by a committee, with two annual meetings, and the only compromise is to mention support when publishing. Any research project in Brazil is under the Brazilian National Ethics Committees on either Human or Animal Experimentation (CONEP and CONCEA) supervision [58, 59]. Clinical protocols have to be uploaded to the official plataformabrasil website, and cannot be initiated prior to approval [60].

The official journal of BSR is now termed Advances in Rheumatology and accepts articles mostly on clinical rheumatology [61]. There is a list of associate editors who are constantly evaluated and reviewed. Articles have to be presented in English (a Portuguese abstract may be included) and are submitted to a blind peer-review process and are of free access in the website. Rheumatology services have collaborations with foreign institutions and associations, particularly the Panamerican League Against Rheumatism (PANLAR) [62]. The Brazilian Congress of Rheumatology, that occurs annually, was recently held, in September 2018, in Rio de Janeiro. With over 3000 participants, we believe it is the second largest Rheumatology congress of a single country. Annually, there are also two regional meetings under BSR coordination, in addition to the Rio-São Paulo Rheumatology meeting and the Advanced Meeting in Rheumatology in São Paulo.

Patient orientation

The Brazilian Society of Rheumatology (BSR) works together with the community to improve patient care. Booklets, online orientation, and health support in finding appropriate services are found in BSR website. Meetings with patient organizations and other health professionals linked to rheumatology are made regularly and are encouraged by BSR to improve patient knowledge about rheumatic diseases. Collaboration of BSR with patient organizations is under the regulation of public health authorities trying to keep this interface as transparent as it can be, avoiding unapproved recommendations by formal regulatory agencies. Patients can also be oriented on access to public services linked to the care of their disease [50].

Non-pharmacological treatment

It seems odd to consider that access to biologics is relatively easy in Brazil whereas facilities for rehabilitation programs are scant. The cost of biologics is huge and benefits relatively few patients. Strange as it may seem, colchicine and allopurinol, among other medications, are not found in the public system. Nutritional orientation, support to mental illnesses, access to physiotherapy and recreation facilities are other major unmet needs. Orthotic devices are not commonly provided, but wheelchairs are available to disabled patients. To our knowledge, there is not a single recommendation protocol in rheumatology that skips non-pharmacological treatment in rheumatic diseases. However, there is virtually no regularly implemented program for rehabilitation in public health services in Brazil. We have to quote some isolated initiatives of public sources mostly in some cities of the previously mentioned better developed southern spots of the country that we hope to be replicated.

Brazilian rheumatologists have also published on non-pharmacologic treatment of rheumatic diseases including patient support [63]. Particularly, two articles demonstrating the benefit of insoles and canes, respectively, for OA patients achieved major impact [64, 65]. Also, a lot of work was done in adapting questionnaires on pain, incapacitation and quality of life evaluation, disease and treatment knowledge which are crucial to provide adequate instruments to conduct clinical protocols.

Surgical access

Access to surgery, although provided, means a long waiting list when patients need joint arthroplasty. Surgery for rotator cuff lesions, carpal tunnel surgery, arthroscopic interventions, plastic reconstruction, among other procedures, although available, can easily take more than 3 years to be executed. On the other hand, emergency care is provided in most cities. Whenever indicated, there is a tendency, in major cities, to perform arthroscopy rather than open joint procedures.

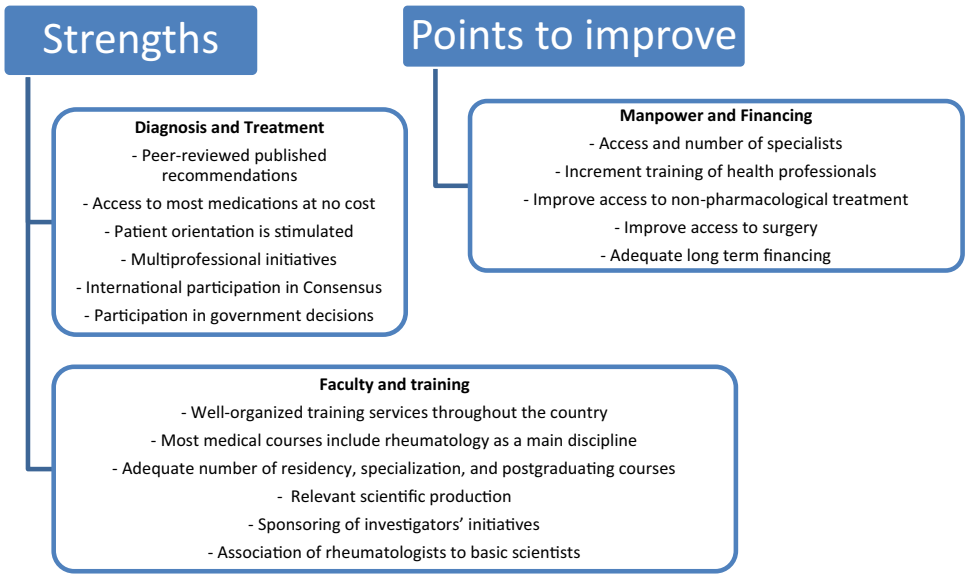


Fig. 2 Overview of rheumatology practice in Brazil

Points to consider

Surprising as it may seem, any Brazilian, regardless of how long someone has become a national citizen and whether or not having directly contributed to the health system, has, under the constitutional law, the right to access to any kind of treatment, regardless of costs and duration of treatment. It is not surprising that such a definition, easy to be written, is even easier not to be respected. This is one of the financial issues concerning the public health system in Brazil that we believe will need to be appreciated in the near future. The fast growing number of senescents and the increase in non-communicable disease patients is already impacting health resources.

Some strengths and points to be improved in the Rheumatology field in Brazil are summarized in Fig. 2. There has been improvement in the care of the rheumatic patient in Brazil. We no longer or hardly ever see severe rheumatoid arthritis patients left untreated [15]. Patients with systemic autoimmune diseases, although with some delays, have access to tertiary centers as well as those with rare diseases, provided a general practitioner or a family physician makes appropriate referral. There is still a long way to run, but we can see ameliorations are on their way.

Author contributions FACR conceived the article, wrote and approved the final manuscript. JIVDL, LNR—data collection (review and search for references). All authors participated in the preparation and revision of the manuscript, read and approved the final version to be submitted.

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Compliance with ethical standards

Conflict of interest Author Rocha FAC declares that he has no conflict of interest; author Landim JIVD declares that he has no conflict of interest; author da Rocha LN declares that she has no conflict of interest.

Ethical approval This article does not contain any studies with human participants of animals performed by any of the authors.

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