saúde EM DEBATE

Indigenous health in the Cerrado: The Inỹ Karajá in focus

Uma abordagem da saúde indígena no Cerrado: os Inỹ Karajá em foco

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ABSTRACT The health status of Indigenous populations in Brazil reflects historical violations that continue to affect their health indicators. This study analyzes the Inỹ Karajá, an Indigenous group from the Cerrado region of Goiás, focusing on barriers to healthcare access. This interdisciplinary research highlights structural and territorial obstacles that hinder the implementation of equitable public policies. Located in Aruanã/GO, the Inỹ Karajá face challenges such as the distance to health units and reliance on river transport. The Araguaia Special Indigenous Health District, responsible for the area, operates with limited infrastructure and high staff turnover, leading to fragmented care. Major health issues include respiratory diseases, tuberculosis, hypertension, and diabetes, all exacerbated by the COVID-19 pandemic, which deepened food and sanitary vulnerability. The study emphasizes the urgency of public policies that integrate traditional knowledge and biomedical healthcare, ensuring culturally sensitive and territorially grounded care. Improving infrastructure, ensuring continuous professional presence in villages, and strengthening Indigenous management within the Indigenous Health Care Subsystem are essential to reducing inequities and promoting Indigenous well-being.

KEYWORDS Indigenous health. Right to health. Social determinants of health. Traditional medicine.

RESUMO *O cenário sanitário das populações indígenas brasileiras reflete violações históricas que ainda impactam seus indicadores de saúde. Este estudo analisa os Inỹ Karajá, etnia do Cerrado goiano, com enfoque nas barreiras ao acesso à saúde. A pesquisa, de caráter interdisciplinar, evidencia obstáculos estruturais e territoriais que comprometem a efetivação de políticas públicas equitativas. Localizados em Aruanã/GO, os Inỹ Karajá enfrentam dificuldades, como a distância até os postos de atendimento e a dependência de transporte fluvial. O Distrito Sanitário Especial Indígena Araguaia, responsável pela região, possui infraestrutura limitada e alta rotatividade de profissionais, o que resulta em atendimento fragmentado. Entre os principais agravos de saúde, estão doenças respiratórias, tuberculose, hipertensão e diabetes, agravados pela covid-19, que intensificou a vulnerabilidade alimentar e sanitária. O estudo destaca a urgência de políticas públicas que integrem saberes tradicionais e medicina ocidental, garantindo cuidado territorializado e culturalmente sensível. A melhoria da infraestrutura, a presença contínua de profissionais nas aldeias e a gestão indígena no Subsistema de Atenção à Saúde Indígena são essenciais para reduzir as iniquidades e fortalecer o bem-viver indígena.*

PALAVRAS-CHAVE *Saúde indígena. Direitos à saúde. Determinantes sociais da saúde. Medicina tradicional.*

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Introduction

> I believe that a large part of the people in the villages have come to see the Indigenous Health Care Subsystem as a complementary complex. When the *pajé* doesn't heal, when the rituals don't heal, when Indigenous therapies don't heal, then white doctors are allowed to take over. Reaching this level of autonomy, in my view, represents progress toward what we had envisioned earlier in our debates. This doesn't happen everywhere across the country, but it gives a sense of victory—a feeling that we have managed to do something to improve the lives of our families. [Krenak, citado por Pontes et al.[1](64)].

The health of Indigenous peoples in Brazil is a complex issue whose analysis necessarily requires attention to the historical context of oppression, violence, domination, and dispossession to which these peoples have been historically subjected—and which continues to shape their lives today. To make sense of this reality, this study draws on an institutional economics approach, widely used in the analysis of health policy and collective health, among other fields. In particular, it mobilizes the concept of path dependence, which, as Bernardi[2] argues, allows for the analysis and understanding of a given reality through its historical trajectory, since no social, cultural, economic, or political phenomenon emerges in the present out of nowhere or all at once; rather, it is the outcome of a series of actions, decisions, and processes carried out over time by different actors and governments. Path dependence considers current realities as the result of layered processes built up and reshaped over decades, centuries, or even millennia. Understanding the health of Indigenous peoples of the Cerrado, as well as the public services designed for them, therefore requires close attention to their history, their trajectories, and the broader context of change over time[2].

The approach adopted here focuses on the Inỹ Karajá people, an Indigenous group living in central Brazil—at the very heart of the Brazilian Cerrado—in the states of Goiás, Mato Grosso, Tocantins, and, a little farther north, Pará. They have inhabited this region long before Portuguese colonizers and Luso-Brazilians invaded their territories. According to Fénelon Costa[3], the Karajá's first contacts with the 'civilized' world likely occurred between the 'late 16th and early 17th centuries', when the *bandeiras* and *entradas*—Portuguese colonial expeditions that moved inland in search of Indigenous labor, land, and resources—reached the 'Araguaia–Tocantins valley'[3], in areas traditionally occupied by these peoples. Toral[4] reinforces this claim by stating that the Inỹ 'came from the North', taking the Araguaia River as a reference point, 'before 1500'[5,6]. The Inỹ people belong to the Macro-Jê linguistic family and speak the Karajá language, which is divided into three languages/groups—Karajá, Javaé, and Xambioá. According to Nunes[7], however, they all speak variants of inỹrybè, which is, in fact, their own language. Data from the Brazilian Institute of Geography and Statistics (IBGE)[8] indicate a total population of 6,123 people, distributed as follows: Karajá, 4,326; Javaé, 1,542; and Xambioá, 255. Inỹ means 'we' or 'people' in the Karajá language, and this is how they refer to themselves[8]; Karajá is a name given to them by non-Indigenous people at the time of first contact.

Between the 17th and 18th centuries, the '*Paulista* slave-raiding expeditions'—carried out by colonists from São Paulo—imposed systematic forms of colonization on the Inỹ, pushing them to move downriver as a strategy for survival. This was followed by the Pombaline policy of 'pacifying the Indians', implemented through Indigenous settlements (*aldeamentos Indígenas*), which functioned as true concentration camps for Indigenous peoples of different ethnic groups. In these spaces, they were subjected to forced labor and sociocultural impositions, and endured physical and moral violence, to which they responded with 'small-scale attacks and retaliations, by both the Karajá and other nationals during the 19th century'[5,6].

From the early 20th century onwards, new pioneering fronts moved into the territories of the Inỹ Karajá in the Upper Araguaia region, forcing successive migrations southward. These changes undermined traditional subsistence practices such as fishing and fruit gathering. The expansion of agriculture and cattle ranching, as well as tourism—especially in Aruanã, in the state of Goiás—intensified territorial instability and directly affected both the physical and cultural survival of these people[9,10].

There were countless harms inflicted on Indigenous peoples as a result of these exploratory-capitalist occupation fronts, as described by Fénelon Costa: a 'sharp decline in population'; 'tuberculosis'; 'venereal diseases'; 'profound changes in the way of life of Indigenous societies'; inequalities in labor relations with non-Indigenous people; disruption of the 'social organization of the Karajá'; and changes in 'activities related to artistic practices'[3].

Since contact with Europeans, Indigenous peoples have been affected by devastating epidemics, due to their lack of natural immunity to viruses, bacteria, and parasites, a consequence of the geographical isolation in which they had lived until then[3]. As colonization unfolded, catechized Indigenous groups—who held knowledge of local flora used in the treatment of native diseases—were encouraged to alter their original values and cultures and to adopt the religious beliefs spread by the Jesuits. In this sense, they were led to believe that illnesses and the deaths resulting from them were divine punishment for 'inappropriate' human behavior, as noted by Brown[11].

Ethnic groups that managed to remain isolated for longer periods in relation to the colonizers preserved ancestral Indigenous medical knowledge, based on the use of Brazil's vast biodiversity of fauna and flora, as well as a mythic relationship with elements of nature. According to Ferreira[12], Indigenous traditional medicines can be understood as shamanic systems—that is, sets of practices and forms of knowledge that produce health, prevent illness, and promote healing, and that are closely linked to cultural, religious, and political dimensions.

As in all (mis)encounters between cultures, there was an exchange of values and knowledge between Brazilian Indigenous peoples and Portuguese colonizers. It is therefore important to highlight that it was Indigenous peoples who taught the first Europeans their methods of making use of nature: hunting, fishing, gathering fruits and honey, as well as the use of medicinal plants and many other natural resources[13].

Brazilian Indigenous peoples are among the most vulnerable groups in the country, affected by diseases commonly found in regions marked by poverty, such as leprosy, tuberculosis, and malnutrition. This reality stems from the legacy of the colonial process, rather than any lack of resilience. After all, the leadership they have assumed in the struggle for their rights in recent decades has its roots in the many different forms of resistance that have existed since colonial times. From this perspective, Rocha, Porto, and Pacheco[14] argue that:

> In the field of public health, these movements gained strength in the late 20th century. In line with the redefinition of the right to health promoted by the Brazilian Health Reform Movement, they began to push for a specific policy on Indigenous health. A milestone in this struggle was the First National Conference on the Protection of Indigenous Health, held in 1986. Until then, state action in this area had been characterized by occasional initiatives and disease-control campaigns in Indigenous villages,

> which included Indigenous peoples as part of the target population, but without any consideration of their living conditions or their specific socio-territorial contexts.

This historical milestone, represented by the First National Conference on the Protection of Indigenous Health in 1986, was not an isolated event detached from a broader historical process; on the contrary, it was the result of a series of developments that unfolded over decades, like a ball of yarn gradually being unwound. From this process emerged the Indigenous Movement in Brazil, which began to organize itself more systematically in the 1970s, with the first documented Assemblies of Indigenous Leaders, although their struggles and forms of resistance go back centuries. Indigenous struggles, especially after the creation of the Indian Protection Service (SPI) in 1910 and the National Foundation for Indigenous Peoples (FUNAI) in 1967, have sought to secure specific land rights, as well as differentiated education and health care[4].

Between the 1960s and 1970s, amid a context of intense national and international tensions, ethnic social movements emerged and placed Indigenous rights on the agenda. This context fostered debates and both governmental and non-governmental meetings, which resulted in important documents such as the Barbados Declarations I (1971), II (1977), and III (1993). These texts advocated alternatives to neoliberal policies, the revision of the Catholic Church's evangelizing practices in relation to Indigenous cultures, and argued that the autonomy of Indigenous peoples would depend on profound transformations in both the state and society[15].

Especially in relation to Indigenous health, which is the central focus of this study, the Barbados Declaration III highlighted the importance of incorporating Indigenous traditional medicine, with its preventive and healing practices, into the work of state agencies responsible for the health of these peoples[15]. From this perspective, the Indigenous Movement in Brazil gradually took shape throughout the 1970s and 1980s, particularly in its struggle for a genuinely differentiated Indigenous health system[9,15], as well as the right to differentiated education and the right to land, which constitutes the core of Indigenous collective rights.

Indigenous health policy in Brazil was built through the strengthening of the Indigenous movement and through events such as the First National Conference on Indigenous Health Protection (CNPSI, 1986), the creation of the Special Indigenous Health Districts (DSEI) and the Intersectoral Commission on Indigenous Health (CISI, 1991), and the Second National Conference on Indigenous Health (CNSPI, 1993). These processes culminated in the enactment of the Arouca Law (1999), which established the Indigenous Health Care Subsystem (SasiSUS), regulated by Decree No. 3,156/99 and further detailed by the National Policy for Indigenous Peoples Health Care (PNASPI, 2002). The policy also incorporated social participation through the District Councils of Indigenous Health (CONDISI) present in all 34 DSEIs[16].

Access of the Karajá people to public health policies

Access to health care among Indigenous populations in Brazil involves social, political, and cultural dimensions. The 1988 Brazilian Constitution guaranteed the universal right to health, a principle further reinforced by the PNASPI, which guides the Indigenous Health Care Subsystem (SasiSUS) and provides for health services that respect Indigenous cultural specificities[17].

The implementation of Indigenous health rights still faces structural and symbolic barriers, particularly regarding the integration of traditional knowledge systems and institutional medical practices. The recognition of Indigenous healing practices is the result of transnational Indigenous movements' struggles since the 20th century[18]. However, as Montenegro and Stephens[19] point out, the translation of these demands into public policy is marked by contradictions and limitations, revealing persistent asymmetries in intercultural healthcare.

The Brazilian Indigenous peoples' epidemiological context carries the tragic legacy of centuries of colonization: from the catastrophic demographic impacts caused by infectious diseases during the colonial period to present-day health inequalities, described as sanitary epistemicide—the systematic devaluation of traditional knowledge in favor of Eurocentric biomedical paradigms[20].

The Inỹ Karajá community, located in the municipality of Aruanã, in the state of Goiás, clearly illustrates this issue. The Inỹ are a people with a long-standing historical tradition, whose settlement has been concentrated along the banks of the Araguaia River, and whose relationship with their territory is shaped by sociocultural dynamics that go beyond the physical dimension of land and human existence[21]. The process of contact with non-Indigenous society—intensified since the colonial period and reshaped in recent decades with the consolidation of Indigenous policy frameworks—has led to profound transformations in their ways of life and in their forms of institutional engagement, particularly in the field of health[22].

Although Indigenous peoples are integrated into Brazil's Unified Health System (SUS) as citizens, they are entitled to differentiated care that respects their own health practices and conceptions of health. This duality generates tensions between universality and specificity, which are reflected in the structural and symbolic limitations of the system. In the case of the Inỹ Karajá, in addition to logistical difficulties—such as traveling to health units located outside Indigenous territories—there are also cultural barriers that undermine the quality and effectiveness of healthcare[23].

In light of this context, the present article proposes an interdisciplinary analysis of the Inỹ Karajá community's access to public health services in Aruanã, Goiás, focusing on the relationship between public policies, territory, and culture. The study is based on the understanding that territory is not merely a geographic space but, above all, a structuring element of social and cultural relations, and that health, in the Indigenous context, cannot be understood without taking into account traditional knowledge systems and the collective practices that shape the everyday lives of these populations[24].

In addition to bibliographic research and the analysis of secondary data, the study incorporated the production of cartographic outputs using QGIS software, with the aim of spatializing information on territory, health services, and epidemiological indicators. Thematic cartography, in this sense, not only complements the analysis but also plays a central methodological role, making it possible to visualize and interpret relationships between space, access, and public policy[24].

Through this approach, the study aims to contribute to the debate on health policies directed at Indigenous peoples, highlighting the tensions, challenges, and possibilities involved in the development of intercultural practices that respect the specificities of the Inỹ Karajá people and ensure the effective realization of the right to health within the context of a multiethnic state[20].

Material and methods

This article adopts a qualitative, interdisciplinary, and descriptive approach focused on the analysis of access to health care among the Inỹ Karajá Indigenous community, located in the municipality of Aruanã, in the state of Goiás, Brazil. The methodological choice is based on the need to integrate both quantitative dimensions—such as territorial distribution and access to health infrastructure—and the sociocultural dynamics that shape the relationship between Indigenous peoples and public health services.

The research was conducted in three main stages: secondary data collection, cartographic production, and interdisciplinary critical analysis. The analytical framework underpinning this stage draws on institutional economics and the following concepts: I) path dependence[2], used to examine changes and continuities in the history of Indigenous health from colonization to the present, based on institutionally imposed rules and norms established by religious, monarchical, and republican forms of power in Brazil; and II) informal institutions, a concept developed by North[25-27] and Hodgson[28-30].

According to the aforementioned authors, human societies construct informal rules in a consensual manner, grounded in tradition and composed of values, beliefs, norms, habits, and social behaviors that are transmitted across generations and persist for centuries. This framework made it possible, throughout the research, to identify that the neglect of health problems affecting the Inỹ Karajá and other Indigenous peoples in Brazil has been historically institutionalized, both formally and informally. This becomes particularly evident when examining the sociocultural and historical contexts in which they are embedded.

In the first stage, data were collected from official sources, with an emphasis on information from public institutions such as IBGE, FUNAI, the Ministry of Health, the Special Secretariat for Indigenous Health (SESAI), and the Indigenous Health Care Information System (SIASI). Legislative documents and public policies were also analyzed, especially the PNASPI[31]. Thus, the exploratory investigation of secondary data included the analysis of grey literature, with inclusion criteria based on the reliability of the data and its relevance to the topic under study. Descriptive data were extracted from the selected references and organized in a text file to support a linear and logically structured argument. Additionally, data processing involved the use of a spreadsheet to input raw values of previously selected qualitative variables extracted from the literature. The descriptive statistical treatment of these numerical data was carried out through graphical representation, without the use of measures of central tendency, dispersion, or epidemiological metrics.

In the second stage, geospatial data were processed and organized for the production of thematic cartographic outputs using QGIS software, which enables the overlay of geographic layers and the construction of analytical maps. Shapefiles available from FUNAI/IBGE[8] were used, including the delimitation of the Karajá Indigenous Territory, municipal boundaries, hydrography, and road networks, as well as the geolocation of health units providing services to the community. The maps were produced by one of the researchers involved in this study. The cross-referencing of this information with population data and health indicators enabled the development of a thematic map showing the territorial boundaries of the community, as well as a graph illustrating the relationship between villages and access to health services through the spatialization of data on coverage, distance, and epidemiological indicators.

The third stage consisted of an interdisciplinary critical analysis integrating geography, anthropology, and public health. Territory was understood, according to Haesbaert, as a sociocultural construction that shapes access to healthcare services. The anthropological approach highlighted the cultural specificities of the Inỹ Karajá and the tensions between traditional knowledge systems and the Western biomedical model, as discussed by Langdon and Diehl[23].

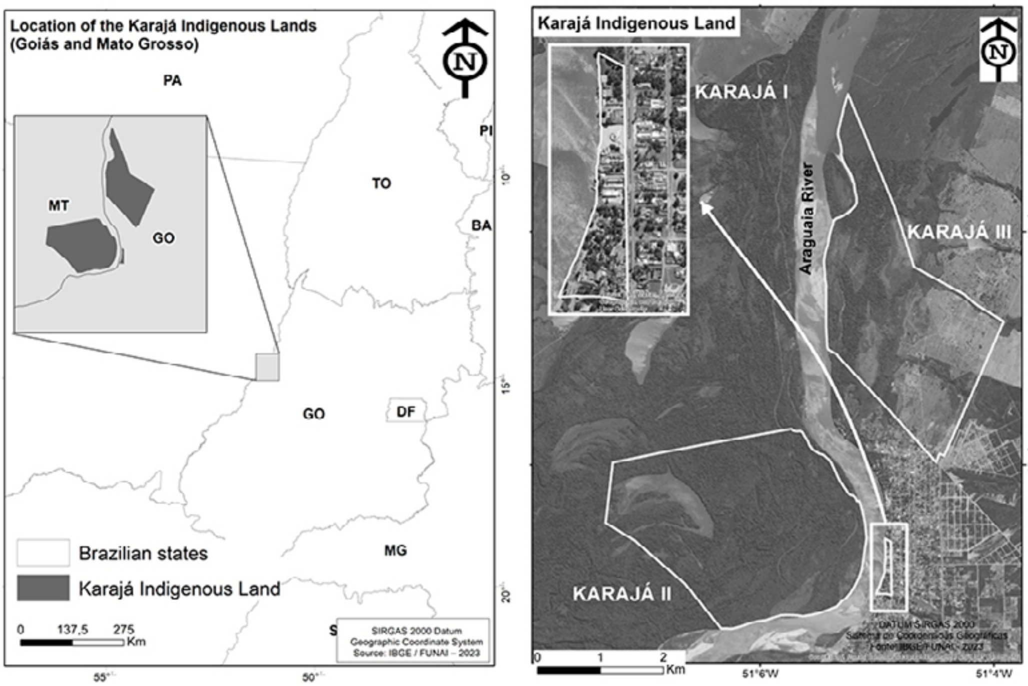
This methodology therefore aims to integrate spatial, political, and cultural data, seeking to broaden the understanding of the phenomenon under analysis and to contribute to the academic debate on public health policies and their effectiveness in Indigenous contexts.

Results and discussion

It is estimated that approximately 100,000 Indigenous people currently live in the Cerrado biome, distributed across 42 distinct groups, with the highest concentration in the states of Maranhão, Tocantins, Mato Grosso, Mato Grosso do Sul, and Goiás[14]. Among these peoples are the Inỹ Karajá. They inhabit 13 Indigenous territories located along the banks of the Araguaia River, in the states of Goiás, Mato Grosso, Pará, and Tocantins[32]. Some of these Indigenous territories include Karajá I (14 hectares) and Karajá III (705 hectares), both in Goiás, as well as Karajá II, in the state of Mato Grosso, with 893 hectares[33,34].

The maps in *figure 1* highlight three Inỹ Karajá Indigenous territories located in the states of Goiás (I and III) and Mato Grosso (II). Among these, particular attention is given to Karajá I, where the Inỹ Karajá people, known as the so-called 'Karajá proper'[7], reside, located in the municipality of Aruanã, Goiás. The maps were produced using IBGE continuous cartographic bases, vector data on Indigenous territories provided by FUNAI, and Google Satellite imagery, integrated into the QGIS geographic information system software (version 3.22).

Figure 1. Location of the Inỹ Karajá Indigenous Land in Goiás and Mato Grosso



Source: Own elaboration.

Understanding access to health care among the Inỹ Karajá community requires recognizing their territory and geographical location within the municipality of Aruanã, Goiás. Territorial delimitation is a fundamental step for understanding the factors that influence the community's access to healthcare. The municipality of Aruanã, Goiás, is home to this community in an area that, although geographically close to the urban center, presents social, cultural, and environmental specificities that directly affect public health policies[16].

Although the municipality of Aruanã has Primary Health Care Units (UBS) and a municipal hospital, the implementation of public health policies directed at the Inỹ Karajá community faces significant barriers related to geographical distance and access conditions. The distribution of villages along the banks of the Araguaia River requires travel via poorly maintained land roads and, frequently, by river transport, which hinders both regular and emergency access to health care services[35].

Transport logistics, often dependent on private boats or those provided by SESAI, reveal weaknesses in the Indigenous health care system, compromising the continuity of care, especially in situations requiring urgent medical attention. Além disso, a vulnerabilidade é agravada em períodos de cheia do rio, quando as rotas terrestres se tornam intransitáveis[36].

National Policy for Indigenous Peoples Health Care (PNASPI), established by the Ministry of Health, ensures comprehensive, intercultural, and territorially appropriate care through the Family Health Strategy and the Special Indigenous Health Districts (DSEIs)[35]. However, studies highlight gaps between these policy guidelines and their practical implementation, particularly due to the lack of permanent healthcare professionals in Indigenous villages and the poor condition of local infrastructure[37]. Thus, access to healthcare for Indigenous peoples goes beyond physical distance alone, also encompassing sociocultural and institutional dimensions that affect autonomy and the right to adequate care. Furthermore, territorial distance becomes a barrier that manifests as institutional exclusion and discontinuity of services[38].

For public policies to be effective, it is essential to take into account the territorial, cultural, and environmental specificities of the Inỹ Karajá people, adopting care strategies that go beyond the urban and hospital-centered model and promote mobile, continuous actions grounded in intercultural dialogue[34,38]. Access to healthcare for the Inỹ Karajá community in Aruanã is hindered by structural, cultural, and logistical barriers. The villages, located in riverside areas along the Araguaia River, face transportation challenges due to their reliance on waterways and poorly maintained roads[39,40].

According to a SESAI report[40], riverside Indigenous communities in the Araguaia River region predominantly rely on small boats to reach UBSs located in Aruanã or in villages with healthcare posts. During flood seasons, land routes become inaccessible, and boats become the only means of transportation; however, these services are limited, irregular, and unsafe, compromising emergency care[40].

In addition, studies such as those by Santos and Pereira[36] indicate that the poor condition of roads hinders access for ambulances and official health transport vehicles, which delays response times in emergencies. This sometimes results in improvised travel using canoes or private transport, which lack adequate equipment for care during transit[36].

The infrastructure of health units also has limitations. According to Souza[37], the units located near the villages do not have the minimum infrastructure required to adequately serve Indigenous populations, lacking observation rooms, basic equipment, and essential supplies for the required treatments. The absence of a consistent supply of medications and first-aid materials further exacerbates the problem[39].

In Aruanã, the lack of electricity and clean drinking water in health units compromises care delivery and the functioning of medical equipment, deepening the structural exclusion of Indigenous peoples. The precarious infrastructure, combined with geographical conditions, hinders the implementation of public policies to ensure universal and equitable access to healthcare[32].

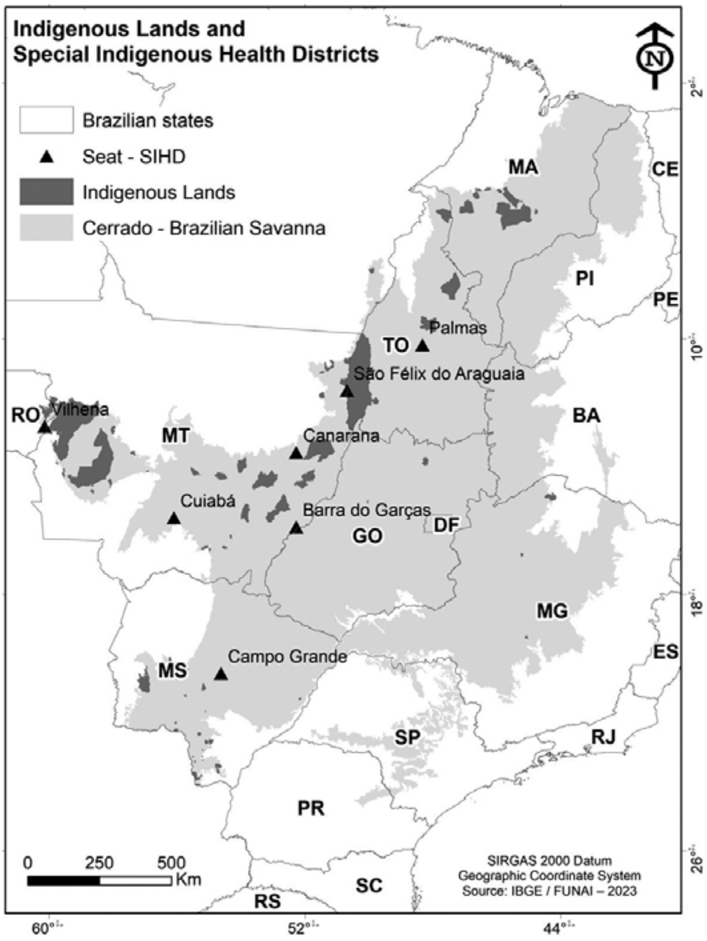
Indigenous health policy in Brazil is implemented through the 34 Special Indigenous Health Districts (DSEIs), created to ensure differentiated and continuous care that respects sociocultural diversity. Although this structure supports decentralization, factors such as vast territorial coverage, logistical challenges, poor infrastructure, and high staff turnover undermine the effectiveness of healthcare delivery in some regions[35,41].

In the case of the Inỹ Karajá community, in the state of Goiás, healthcare provision falls under the responsibility of the Araguaia DSEI, based in São Félix do Araguaia, Mato Grosso, which covers an area of 15,375 km². Because this DSEI extends across state boundaries and encompasses peoples with different languages, cultures, and social realities, its jurisdiction includes Indigenous populations totaling 5,505 inhabitants from 53 villages, as well as 977 individuals living outside their villages, belonging to the Karajá, Tapirapé, Tapuia, Avá-Canoeiro, Krenak, Maxacali, and Kanela ethnic groups, distributed across 13 municipalities as follows: (a) in Goiás—Aruanã, Minaçu, Nova América, and Rubiataba; (b) in Mato Grosso—Canabrava do Norte, Confresa, Luciara, Porto Alegre do Norte, Santa Terezinha, and São Félix do Araguaia; and (c) in Tocantins—Formoso do Araguaia, Lagoa da Confusão, and Pium[23,34].

The DSEI has Base Centers (*Polo Base*) in the cities of Goiás/GO, Confresa/MT, Santa Terezinha/MT, and São Félix do Araguaia/MT, of which the latter two have a predominance of the Inỹ Karajá ethnic group[40]. This territorial scope entails significant operational challenges, such as the mobility of healthcare teams, the continuous provision of services, and intercultural dialogue between non-Indigenous professionals and the communities served[40].

It is worth noting that the Indigenous healthcare system in Brazil is organized into Special Indigenous Health Districts (DSEIs), which are decentralized units that provide healthcare services to Indigenous peoples on a regional basis. In the Cerrado biome, there are 216 Indigenous territories served by seven DSEIs, namely Xavante, Xingu, Araguaia, and Cuiabá in Mato Grosso; Tocantins, in the state of Tocantins; and Vilhena, in Rondônia and Mato Grosso do Sul. *Figure 2* shows the spatial distribution of Indigenous lands in the Cerrado, based on vector data provided by FUNAI and IBGE, as well as the location of DSEI headquarters, according to data from the Ministry of Health[42].

Figure 2. Indigenous lands in the Cerrado biome and the headquarters of the DSEIs



Source: Own elaboration.

Spatial visualization makes it possible to identify the breadth of challenges faced by the Indigenous health subsystem, particularly in large and hard-to-reach territories such as the Araguaia DSEI. This district, which includes the Karajá I Indigenous Territory, highlights the complexity of providing continuous and culturally appropriate care to dispersed populations in areas marked by unequal access to public services. Map 2, therefore, not only locates the DSEIs and Indigenous Territories but also reinforces the need for territorially grounded policies that are sensitive to the specific realities of each Indigenous people[40].

Despite the efforts of the DSEI, the Inỹ Karajá community faces significant barriers to accessing healthcare, especially due to the scarcity and high turnover of professionals in Indigenous UBSs. This discontinuity compromises treatment follow-up and the development of bonds with the community. This issue stems from the difficulty in attracting professionals to remote areas, as well as the precarious working and living conditions provided[42].

The inadequate infrastructure of health units and the lack of basic resources, such as equipment, supplies, and logistical support, hinder the performance of activities. This leads to frustration and professional exhaustion, reducing interest in remaining in the territory. Furthermore, the absence of adequate housing, food, and sanitation also negatively impacts the quality of life of professionals, who are often required to live in austere conditions[37].

Geographic isolation limits access to essential services and affects social life, making it more difficult to attract and retain professionals in the region. The lack of support policies, such as reception mechanisms, training, and financial incentives, combined with the absence of professional recognition and cultural appreciation, contributes to high turnover and low retention of these workers in Indigenous contexts[24,38]. In this regard, the Mais Médicos Program sought to address the shortage of professionals in remote areas but faced limitations in ensuring continuity of care and cultural integration. Additionally, the high turnover of these workers undermines relationships with communities and hinders understanding of cultural specificities, thereby weakening trust in the service[35,43].

Intercultural dialogue is essential for access to Indigenous healthcare. The absence of professionals who understand the language and customs of the Inỹ Karajá hinders communication and generates distrust. In this context, the neglect of traditional practices by formal health services can lead to community resistance, since for these people health involves spiritual, communal, and environmental balance—a perspective that differs from the biomedical approach, which is centered on diagnoses and clinical treatment[35,36].

Healthcare professionals often fail to recognize or devalue traditional healing practices, such as the use of medicinal plants, rituals, and the role of *pajés* (Indigenous spiritual leaders). This creates distance and mistrust between the community and public health services[34,44]. The study by Santos and Pereira[36] revealed that, in the Inỹ Karajá community, the lack of dialogue between healthcare teams and Indigenous leaders compromises the implementation of preventive programs, as actions are not aligned with local calendars and rituals, thereby reducing community participation.

Between 2020 and 2022, medium- and high-complexity healthcare services, as reported by the DSEI (*graph 1A*), included cardiopathies (n = 20), cataracts (n = 64), fractures (n = 38), upper respiratory tract infections (n = 101), pneumonia (n = 20), intestinal disorders (n = 73), mental disorders (n = 15), renal disorders (n = 13), and various other conditions combined (n = 37). These patients were initially referred by primary healthcare services and subsequently directed to health facilities within the coverage area of the Base Center (Polo Base)[42].

The Indigenous Health Support House (CASAI) in Goiânia represents a significant challenge in access to specialized healthcare services. CASAI, which is linked to the Special Secretariat for Indigenous Health (SESAI), is responsible for providing accommodation and support to Indigenous peoples who require medical treatment outside their traditional territories. A total of 58 different morbidities were referred to CASAI in 2020, 2021, and 2022, with subtotals of 53, 90, and 100 cases, respectively. In total, there were 243 cases over the three years, of which the main morbidities were mental disorders, pemphigus, glaucoma, cervical cancer, high-risk pregnancy, psoriasis, arterial hypertension, diabetes, HIV, chronic kidney failure, and schizophrenia (*graph 1B*)[42].

The significant distance between Aruanã and Goiânia results in long travel periods, predominantly by road. This displacement is marked by difficulties related to poor road infrastructure, adverse weather conditions, and the limited availability of adequate and accessible transport. In addition, the financial costs associated with transportation, food, and accommodation in the capital constitute further barriers for many Indigenous families, who often rely on public resources or government support to cover these expenses[16,35]. Given these difficulties, institutional coordination and support are crucial to ensuring the continuity and effectiveness of healthcare delivery. The Araguaia DSEI, in partnership with FUNAI and other institutions, organizes transportation and provides logistical and financial support to Indigenous patients and their companions, seeking to mitigate the impacts of travel. This support also includes emotional assistance and help in accessing healthcare services during their stay in Goiânia[16,35].

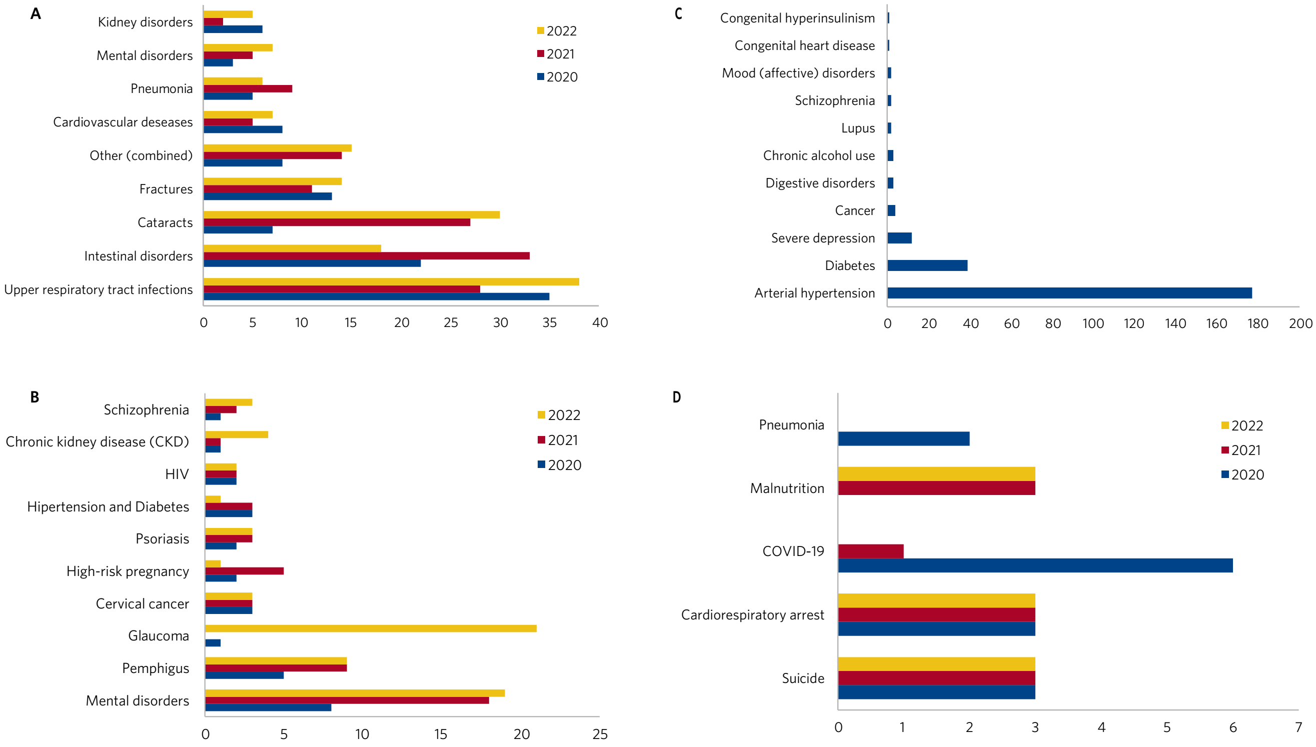
Thus, travel to CASAI, although essential for accessing specialized treatment, highlights the vulnerabilities faced by Indigenous communities in urban contexts and reinforces the need for public policies that take cultural and territorial specificities into account, promoting equity in healthcare access[17]. Between 2022 and 2024, epidemiological data from Aruanã show the persistence of respiratory diseases as the main health conditions reported among Indigenous peoples in the region, especially the Inỹ Karajá people. Influenza-like syndrome and acute respiratory infections are among the most frequent conditions, with peaks recorded in 2024, indicating possible weaknesses in access to preventive measures, sanitation, and adequate healthcare infrastructure[42,43].

COVID-19 affected the Inỹ Karajá with human losses and worsened food vulnerability due to the delayed and insufficient distribution of food baskets, highlighting the growing detachment of young people from traditional food production practices. Although COVID-19 cases declined after 2022, diseases such as acute diarrhea and tuberculosis persist, reflecting precarious conditions of water access, nutrition, and housing[42,43,45].

These data reinforce the importance of SasiSUS presence in the territory and point to the need for intersectoral public policies aimed at health promotion and disease prevention in Indigenous contexts[35]. The Araguaia DSEI has, as one of its priority areas, the prevention and control of chronic diseases, as well as the reduction of infant and maternal mortality, improved access to vaccination, and the promotion of health and well-being. In this regard, 72% of users with non-communicable chronic diseases treated in 2022 had systemic arterial hypertension (n = 177), followed by diabetes and depression, accounting for approximately 16% and 5% of these users, respectively (*graph 1C*)[46].

Between 2022 and 2024, three deaths were recorded in the Indigenous community of Aruanã and were attributed to causes considered preventable or infectious, such as respiratory infections, diarrheal diseases, and perinatal complications. Although numerically limited, these events represent sensitive indicators of the structural conditions of the healthcare system and reflect persistent inequalities in the social determinants of Indigenous health. The preventability of these deaths indicates gaps in primary healthcare, including delayed access to health facilities, a shortage of specialized professionals, and weaknesses in health surveillance actions within the territory[42,43,46]. Within the DSEI, a total of 33 deaths were recorded between 2020 and 2022 (*graph 1D*), with the main causes of mortality being suicide (n = 9), cardiac arrest (n = 9), COVID-19 (n = 7), malnutrition (n = 6), and pneumonia (n = 2)[42,46].

Graph 1. Number of cases attended at DSEI Araguaia



Source: District Plan for Indigenous Health (2024-2027) – Araguaia Special Indigenous Health District.

A) Main specialties generating referrals to medium- and high-complexity care; B) Main specialties generating referrals to the Indigenous Health Care Center (CASAI); C) Number of users with chronic non-communicable diseases requiring specific intervention/care in 2022; D) Causes of overall mortality.

The literature indicates that preventable deaths can be avoided through interventions such as adequate prenatal care, immunization, access to safe drinking water, and effective primary healthcare. Therefore, monitoring these deaths is essential for evaluating public policies and for developing intersectoral strategies tailored to the sociocultural specificities of the Inỹ Karajá people[47].

The analysis of epidemiological data from Aruanã between 2022 and 2024 reveals a complex and challenging scenario regarding Indigenous health, particularly for the Inỹ Karajá people. The high incidence of respiratory diseases—such as influenza-like illness and acute respiratory infections—combined with the persistence of conditions such as acute diarrhea and tuberculosis, exposes structural weaknesses in primary healthcare services and in preventive actions[11,18]. The reduction in COVID-19 cases is a positive indicator, reflecting immunization strategies and the resilience of Indigenous communities in the face of adversity; however, it does not eliminate the ongoing vulnerability to other health conditions[45-47].

Even at low levels, the persistence of deaths from avoidable or infectious causes reinforces the need for more qualified, continuous, and culturally appropriate healthcare, aligned with the social, territorial, and cosmological particularities of the Inỹ Karajá people[23,46]. Despite its strategic importance, the Araguaia DSEI's operations are constrained by high professional turnover, resource shortages, and logistical barriers to reaching isolated territories[23].

The data discussed not only characterizes the health profile of the Indigenous population of Aruanã but also highlights the urgency of strengthening intersectoral public policies that integrate health, sanitation, education, and the recognition of traditional knowledge[47]. The production and critical use of epidemiological information thus represent a strategic tool for health planning and for supporting Indigenous autonomy and protagonism in the construction of their own pathways of care and well-being[47].

Final considerations

This study highlights the structural and historical challenges affecting access to public healthcare among the Inỹ Karajá, an Indigenous people of the Cerrado biome in the state of Goiás. The analysis shows that geographical barriers, inadequate sanitation infrastructure, and high turnover of healthcare professionals within the DSEIs perpetuate inequalities in service provision, reflected in the prevalence of respiratory, chronic, and infectious diseases in this population. The COVID-19 pandemic further exacerbated pre-existing vulnerabilities, exposing weaknesses in food and sanitation assistance policies. The findings suggest that the effectiveness of SasiSUS depends on the territorialization of health services, with logistical adaptations for riverside communities; the recognition and integration of Indigenous medical knowledge into biomedical practice; and the stability of healthcare professionals through structural incentives and intercultural training.

The health of the Inỹ Karajá population depends on intersectoral strategies that combine Indigenous participation in governance, investment in adequate infrastructure, and policies addressing social determinants of health. Such approaches are essential to move beyond exclusion toward forms of care that respect autonomy and strengthen community well-being.

This study contributes to the broader debate on Indigenous health policy by examining, from a multidimensional perspective, the challenges involved in implementing culturally responsive intercultural models. It also highlights the tensions between the universal principles of the Brazilian Unified Health System (SUS) and local sociocultural specificities, mapping the main barriers faced by the Inỹ Karajá—particularly those related to geography, culture, and health system organization. Finally, it points to the need for approaches that meaningfully integrate Indigenous knowledge and biomedicine on an equitable basis, thereby advancing the right to health in multiethnic contexts.

Authorship contributions

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