

INTRAMETROPOLITAN FLOWS IN THE CARIRI METROPOLITAN REGION (CEARÁ): A STUDY ON HEALTH AND HIGHER EDUCATION

Fluxos intrametropolitanos na Região Metropolitana do Cariri (Ceará): um estudo sobre saúde e ensino superior

Flujos intrametropolitanos en la Región Metropolitana del Cariri (Ceará): un estudio sobre salud y educación superior



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ABSTRACT

The Cariri Metropolitan Region (RMCari), established in 2009, is a major regional hub for commerce and services in southern Ceará, which encompasses nine municipalities, with Crato, Juazeiro do Norte, and Barbalha (Crajuubar) as its core. This study examines the metropolitan integration of RMCari through intrametropolitan flows related to access to health services and higher education. The methodology involved bibliographic and documentary research, as well as the analysis of secondary data collected from the region's main public hospitals and higher education institutions. The results confirm Crajuubar's centrality, particularly Juazeiro do Norte and Barbalha. Barbalha stands out in healthcare, hosting two of the three largest hospitals in RMCari and the region's first medical school, while Juazeiro do Norte leads in higher education due to the establishment of the Federal University of Cariri (UFCA) and the expansion of private institutions. The findings indicate that mobility for these services strengthens metropolitan structuring, although challenges persist, such as the concentration of facilities in a few municipalities and the potential influence of these flows on intrametropolitan migration. Further research is recommended to correlate these mobility patterns with migratory data and to conduct longitudinal analyses of metropolitan integration trends.

Keywords: Metropolitan integration; pendulum movements; Health services; Higher education; REGIC.

RESUMO

A Região Metropolitana do Cariri (RMCari), criada em 2009, constitui um importante polo comercial e de serviços no sul do Ceará, abrangendo nove municípios e tendo como núcleo central Crato, Juazeiro do Norte e Barbalha (Crajuubar). Este estudo investiga a integração metropolitana da RMCari a partir dos fluxos intrametropolitanos de acesso aos serviços de saúde e ensino superior.

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A metodologia incluiu pesquisa bibliográfica e documental, além da análise de dados secundários coletados nos principais hospitais públicos e instituições de ensino superior da região. Os resultados confirmam a centralidade do Crajubar, especialmente de Juazeiro do Norte e Barbalha. Barbalha se destaca na saúde, por sediar dois dos três maiores hospitais da RMCari e o primeiro curso de medicina da região, enquanto Juazeiro do Norte lidera no ensino superior, impulsionado pela instalação da Universidade Federal do Cariri (UFCA) e pelo crescimento de instituições privadas. Como resultados, tem-se que os fluxos de deslocamento para esses serviços reforçam a estruturação metropolitana, embora desafios persistam, como a concentração dos equipamentos em poucos municípios e a possível influência desses fluxos na migração intrametropolitana. Sugere-se a realização de estudos futuros que correlacionem esses deslocamentos com os dados migratórios e análises comparativas ao longo do tempo para acompanhar a evolução da integração metropolitana.

Palavras-chave: Integração metropolitana; movimentos pendulares; Serviços de Saúde; Educação superior; REGIC.

RESUMEN

La Región Metropolitana del Cariri (RMCari), creada en 2009, constituye un importante centro de servicios en el sur de Ceará, abarcando nueve municipios y teniendo como núcleo central a Crato, Juazeiro do Norte y Barbalha (Crajubar). Este estudio investiga la integración metropolitana de la RMCari a partir de los flujos intrametropolitanos de acceso a los servicios de salud y educación superior. La metodología incluyó investigación bibliográfica y documental, además del análisis de datos secundarios recolectados en los principales hospitales públicos e instituciones de educación superior de la región. Los resultados confirman la centralidad del Crajubar, especialmente de Juazeiro do Norte y Barbalha. Barbalha destaca en salud, al albergar dos de los tres hospitales más grandes de la RMCari y la primera carrera de medicina de la región, mientras que Juazeiro do Norte lidera en educación superior, impulsado por la creación de la Universidad Federal de Cariri (UFCA) y el crecimiento de instituciones privadas. Como resultados, se observa que los flujos de desplazamiento hacia estos servicios refuerzan la estructuración metropolitana, aunque persisten desafíos, como la concentración de equipamientos en pocos municipios y la posible influencia de estos flujos en la migración intrametropolitana. Se sugiere la realización de estudios futuros que correlacionen estos desplazamientos con los datos migratorios y análisis comparativos a lo largo del tiempo para seguir la evolución de la integración metropolitana.

Palabras clave: Integración metropolitana; movimientos pendulares; Servicios de salud; Educación superior; REGIC.

1 INTRODUCTION

The Cariri Metropolitan Region (RMCari) is a political-administrative arrangement located in the extreme south of Ceará, established by Complementary Law No. 78 of June 26, 2009. In addition to creating RMCari, this legislation also established the Development and Integration Council and the Development and Integration Fund of the Cariri Metropolitan Region (FDMC). This metropolitan region is composed of the municipalities of Juazeiro do Norte, Crato, and Barbalha, as well as Jardim, Missão Velha, Caririçu, Farias Brito, Nova Olinda, and Santana do Cariri. It is responsible for integrating the organization, planning, and execution of public functions of common interest (Ceará, 2009).



Thus, with a consolidated urban reality characterized by a significant population and high demographic density, the main core of this metropolitan region, composed of the municipalities of Crato, Juazeiro do Norte, and Barbalha—collectively known as Crajubar—has reinforced its position as the largest urban agglomeration in the state's interior. Furthermore, its growing socioeconomic prominence, driven by various public and private investments, has made the Cariri region eligible to receive metropolitan status.

The political decision to create this metropolitan region (MR) was tied to the selection of new areas for investment and the concentration of policies, equipment, and public services capable of promoting socioeconomic growth, following a model similar to that of the Fortaleza Metropolitan Region (Cartaxo, 2009).

The establishment of the Cariri Metropolitan Region was grounded in the need to coordinate and execute public functions of shared interest. Furthermore, the creation of RMCariri was associated with the idea of regional development, a common feature of metropolitan regions established after the 1988 Constitution. In this context, elevating certain areas to metropolitan region status came to be seen as an opportunity for implementing new public policies and investments with a developmental focus. However, this process did not always adequately consider the institutional framework and spatial organization necessary for the effective constitution of a metropolitan region (Nascimento, 2018).

In this sense, it is important to highlight that "the discussion of the metropolitan region as an institutional arrangement means, in Brazil, attributing to the term a character more related to a regional development perspective than to an urban-metropolitan one" (Firkowski, 2012, p. 35). According to the same author, many Brazilian states find no institutional basis for implementing regional policies except through the metropolitan regions, justified by the absence of a regional instance in the Federal Constitution, resulting in a legal administrative void.

The triangle formed by the municipalities of Crato, Juazeiro do Norte, and Barbalha concentrates the main regional expression, housing the majority of the population, industrial activities, and essential goods and services for the entire southern region of Ceará and, consequently, for RMCariri. Thus, this area functions as a hub for goods and services in a strategic central region of the semi-arid northeastern hinterland, with influence extending into parts of the states of Ceará (southern and central-southern regions), Pernambuco (northwestern region), Paraíba (western region), and Piauí (southeastern region).



The socioeconomic growth context of RMCariri—and particularly Crajubar—reflects the Brazilian trend of promoting the expansion of medium-sized inland cities due to income growth, increased consumption of goods and services, and the decentralization/internalization of strategic services in recent decades.

However, the following question arises: how does metropolitan integration in RMCariri occur through the provision of goods and services? Thus, the objective of this research is to investigate how the process of metropolitan integration in RMCariri takes place through intrametropolitan flows, with a focus on access to health services and higher education.

The methodological foundation was based on bibliographic and documentary research. To complement the understanding of the integration level among municipalities, research was carried out in the three key hospitals serving the public health network to identify the origin of patients seeking care in these facilities. Following the same logic, the three largest higher education institutions in RMCariri were also contacted to determine the territorial origin of their respective students.

This research is divided into sections. In addition to this introduction, the methodological procedures section outlines the procedures and research techniques; the theoretical framework addresses conceptual notions regarding metropolitan regions and provides a brief historical overview of the origin of RMCariri; the results and discussion section highlights and analyzes the research findings; the final considerations section presents the conclusions based on the results and offers recommendations for future studies; finally, the references are presented.

2 METHODOLOGICAL PROCEDURES

This study adopts a qualitative approach and was based on bibliographic and documentary research. Bibliographic research involves the analysis of previously published materials, such as printed sources (books, journals, theses, dissertations, dictionaries, encyclopedias, yearbooks, almanacs, etc.), as well as various other media, including discs, magnetic tapes, CDs, and online publications (Gil, 2010). Its objective is to “place the researcher in direct contact with everything that has been written on a given topic” (Marconi & Lakatos, 2013, p. 44). In this study, both classic and contemporary theses, dissertations, books, and articles on the topic were consulted.



Documentary research, in turn, focuses on materials that have not yet undergone analytical treatment or that can be reanalyzed for (re)interpretation (Godoy, 1995). It draws on a wide range of documents produced for various purposes, such as records, authorizations, communications, research reports, company newsletters, legal documents, statistical reports, and more (Gil, 2010, p. 29).

The locus of the study is the Cariri Metropolitan Region (RMCariri), a cluster of nine municipalities located in southern Ceará, covering an area of 5,460.084 km² and home to 633,326 inhabitants (IBGE, 2022). The municipalities of greatest demographic and economic relevance are Juazeiro do Norte, Crato, and Barbalha. Juazeiro do Norte alone accounts for nearly half of the region's population.

The regional economy is predominantly based on the tertiary sector, particularly in Crajubar municipalities. However, this pattern is not uniform across the nine municipalities, as some—especially Missão Velha—still maintain economies centered on agriculture and livestock. RMCariri also holds significant geo-environmental importance due to the presence of the Araripe Plateau and the Araripe National Forest, along with a rich paleontological heritage (Nascimento, 2018).

Data on intrametropolitan flows in RMCariri—specifically access to health and higher education services—were collected between 2016 and 2017. Health service data refer to 2016, while higher education data refer to 2017, allowing for comparative and temporal analysis of intermunicipal flows in both sectors. This time frame was selected because RMCariri marks its 16th anniversary between 2009 and 2024, with the years 2016 and 2017 representing the midpoint of its institutional cycle—thus offering an intermediate perspective on the evolution of metropolitan integration and service-related flows.

To investigate metropolitan integration through access to health services, data were collected from the region's three main public hospitals: São Vicente de Paula and Santo Antônio, both in Barbalha, and the Regional Hospital of Cariri in Juazeiro do Norte. The objective was to identify the municipalities of origin of patients who sought care in these facilities.

The author formally requested authorization from the hospitals to collect data on the number of patients treated, disaggregated by municipality of residence, for the period between January 1 and December 31, 2016.

These data aimed to map intermunicipal flows of individuals who traveled from their home municipalities to others within the metropolitan region to access specialized healthcare services.



Following the same rationale, the three central higher education institutions in RMCari—the Regional University of Cari (URCA), with campuses in Crato and Juazeiro do Norte; the Federal University of Cari (UFCA), with campuses in Barbalha, Crato, and Juazeiro do Norte; and the Leão Sampaio University Center (Unileão)—were also contacted to identify the territorial origin of their enrolled students for the first semester of 2017.

During data collection from the Higher Education Institutions (HEIs), recurring issues included missing entries or information that listed only the municipality without specifying the corresponding state. Cases involving homonymous municipalities without the identification of the state (federative unit) were excluded from the analysis. The same procedure was applied to the hospital data regarding patients' origins.

The findings were compared with data from the study “*Regions of Influence of Cities – REGIC 2018*”, published by IBGE, which includes specific discussions on flows related to healthcare and higher education.

It is worth noting that, as the study relied solely on secondary data, it did not require submission to the research ethics committee via Plataforma Brasil, in accordance with Resolution No. 510/2016 of the National Health Council (CNS), which establishes guidelines for research in the Human and Social Sciences. The sole paragraph listing cases that are exempt from review by the CEP/CONEP system specifies: “V – research using databases with aggregated information, with no possibility of individual identification” (Brazil, 2016, p. 2), thus fully complying with ethical research standards.

3 THEORETICAL FRAMEWORK

This section discusses conceptual notions related to metropolitan regions, presenting their main theoretical and conceptual basis and elements of characterization. Additionally, regarding the object of study, it offers a brief historical overview of the origin of the Cari Metropolitan Region (RMCari).

3.1 Metropolitan Regions: conceptual notions and characterization

There are multiple definitions and approaches to the term “metropolitan region.” More recently, following the enactment of the Metropolis Statute, a metropolitan region is defined as an “urban agglomeration that constitutes a metropolis” (Brazil, 2015, p. 2).



There is, however, criticism of how the term “metropolitan region” has been understood and applied in Brazil. It is often “appropriated by legislation to refer to an institutionally defined configuration, rather than to represent the institutionalization of a large-scale urban phenomenon marked by economic and social contradictions [...]” (Moura, 2009, p. 75). Souza (2013) supports this view by criticizing the lack of conceptual rigor in the use of the term “region” in Brazil, explaining:

The term *region*, as used in Brazil, is not particularly rigorous, since most authors agree that a region is a spatial unit larger than the local scale (such as a city or municipality, or even an agglomeration or a metropolis), yet smaller than the national scale. A metropolitan area would more accurately correspond to an 'expanded local scale,' particularly in a large country. However, the main issue arises when formally designated metropolitan regions are created and granted metropolitan status, despite being mere urban agglomerations lacking the complexity or regional influence to justify such classification (Souza, 2013, p. 35–36).

To address this issue, Firkowski (2013) proposes two different analytical scales: the metropolitan area and the metropolitan region. The former refers to areas with truly metropolitan characteristics, while the latter refers to regions that may develop such characteristics in the medium term—often composed of municipalities not yet integrated into a metropolitan dynamic but with potential for future inclusion.

In one of the pioneering studies on metropolitan debates in Brazil, Galvão *et al.* (1969, p. 55–56) defined a metropolitan area as:

A group of municipalities that are economically and socially integrated with a metropolis, mainly through a shared occupational structure and spatial organization, representing either its immediate or long-term expansion area. A set of common interest problems—especially those related to economic and social infrastructure—creates the need for institutions to address and guide the resolution of issues that such population concentration may generate.

Common characteristics of most metropolitan regions include: high urban population concentration; high demographic density; urban sprawl resulting from conurbation and peripheral expansion into neighboring municipalities; polarization and influence over a regional network of cities; state and national relevance; and functional interdependence based on strong economic articulation and intense intermunicipal flows (IPEA, 2001; Freitas, 2009). In this same regard, Santos (2008, p. 84) observes that:

[...] contemporary metropolitan regions share two essential characteristics:
(a) they are formed by more than one municipality, with the core city—after

which the region is named—being significantly larger than the others; and (b) they are the subject of special programs led by regional agencies created for this purpose, often with federal resources and regulations. In practice, they function as planning regions, although efforts tend to be limited to sectoral issues rather than addressing broader regional challenges.

Ideally, there should be no significant socioeconomic disparities or differences in quality of life between the municipalities within a given metropolitan region. When such inequalities exist, they often trigger migratory movements between surrounding cities and the metropolitan core, placing additional strain on the social infrastructure and public services of the region's central municipalities.

3.2 A Brief History of the Origin of the Cariri Metropolitan Region

The agglomeration formed by Crato, Juazeiro do Norte, and Barbalha—collectively known as Crajubar—holds notable importance in the urban networks of Ceará and the broader Northeast region. Historically, these cities have demanded greater autonomy and qualitative transformations in the local socio-political structure (including economic growth, the promotion of regional potential, social development, and tailored public policies), all under the broader banner of regional development. Notably, several movements have emerged advocating for the creation of an autonomous state separate from Ceará, citing a lack of proper attention from state authorities.

As the process of conurbation became consolidated in Crajubar—starting in the early 21st century—and the cities began to experience a more intense process of socioeconomic integration, the shared challenges of the three municipalities began to demand coordinated planning. This gave rise to political—and later academic—discussions about Cariri's spatial reality, centered on the urban-regional phenomenon of Crajubar (Nascimento, 2018).

The first attempt to create a regional unit aimed at the socioeconomic integration of Cariri occurred in the mid-2000s. At the time, State Representative Íris Tavares—whose electoral base was Juazeiro do Norte—introduced Complementary Bill No. 02/2004 in the Ceará State Legislative Assembly. The bill proposed the creation of the CÍCERO Metropolitan Region (initially called the Metropolitan Region of Cariri of Ceará), composed of the municipalities of Juazeiro do Norte, Crato, Caririáçu, Barbalha, and Missão Velha (Queiroz, 2013).



This proposal underscored the centrality of Juazeiro do Norte, even naming the metropolitan region after the city's founder, Father Cícero Romão Batista²¹. Moreover, the included municipalities shared borders with Juazeiro do Norte. Although the proposal was ultimately unsuccessful, it sparked important discussions and can be seen as the initial milestone toward the future creation of a metropolitan region encompassing the same area.

Years later, following a proposal by the Ceará state government itself, Complementary Law No. 78 of June 26, 2009, was enacted and sanctioned, establishing the Cariri Metropolitan Region and also creating the Development and Integration Council and the Development and Integration Fund of the Cariri Metropolitan Region (FDMC). This new metropolitan region came to include the municipalities of Juazeiro do Norte, Crato, Barbalha, Jardim, Missão Velha, Caririaçu, Farias Brito, Nova Olinda, and Santana do Cariri. Its mission is to coordinate the organization, planning, and execution of public functions of common interest (Ceará, 2009).

Between the initial proposal to create a metropolitan region in Cariri and its formal establishment in 2009, additional municipalities were incorporated into the process. These included Farias Brito, Nova Olinda, and Santana do Cariri, which border Crato, as well as Jardim, which borders Barbalha. As a result, the core of the metropolitan region became the Crajubar cluster, rather than being limited solely to Juazeiro do Norte, as initially proposed by former representative Íris Tavares. Consequently, all municipalities bordering Crato, Juazeiro do Norte, and Barbalha were included in the formation of this political-administrative arrangement.

4 RESULTS AND DISCUSSION

Commuting or pendular movements are characterized by the displacement of a population from one municipality to another to carry out work, study, and/or routine activities. They are very common in areas of high population density, such as metropolitan regions. The analysis of this process is widely used to understand metropolization itself (Moura; Castello Branco; Firkowski, 2005, p. 124). The main purposes of commuting movements are work and study, but others may include access to commercial and service activities.

¹ Father Cícero Romão Batista was a prominent religious leader who later entered politics, becoming the founder and first mayor of the municipality of Juazeiro do Norte. Throughout the year, thousands of devotees—particularly from Brazil's Northeastern states—make pilgrimages to Juazeiro do Norte in his honor. The so-called "Miracle of the Host," in which blood was said to have flowed from the mouth of the pious Maria de Araújo during communion, played a key role in spreading Father Cícero's reputation as a miracle-working priest across the Northeast.



In addition, information about commuting flows also allows us to identify the roles performed by urban centers, whether in concentrating employment or offering services such as education and transportation (IBGE, 2010). Therefore, commuting movements are considered indicators of functional integration among localities and an important analytical reference for the metropolization process (Moura; Castello Branco; Firkowski, 2005).

While commuting is typically analyzed through data on work and education, other essential services, such as healthcare, can also signal flows of people moving to other municipalities to address specific needs.

4.1 Intrametropolitan flows for hospital care in RMCariri

Among the reasons that generate population movements within the urban network is the search for healthcare services. For this reason, understanding how these flows occur is important to grasping the urban network itself (IBGE, 2020). Temporary migration for access to healthcare services—particularly in more complex cases—is still a relatively underexplored topic, yet necessary for understanding commuting movements (Zaslavsky e Goulart, 2017).

To investigate the level of integration among RMCariri municipalities, a survey was conducted at the three main hospitals in the region that serve the public health system, either fully or through agreements: Hospital Maternidade São Vicente de Paula and Hospital Santo Antônio, both located in Barbalha; and the Hospital Regional do Cariri (HRC), located in Juazeiro do Norte.

Table 01 details the total number of outpatient visits and hospitalizations at each hospital unit for the year 2016.

Table 01 - Intrametropolitan origin in the Cariri Region of patients treated in the main hospital units

Municipality	Hospital Maternidade São Vicente – Barbalha		Hospital Santo Antônio - Barbalha		Hospital Regional Cariri – HRC*
	Outpatient care	Hospitalizations	Outpatient care	Hospitalizations	Hospitalizations
Barbalha	35.214	4.471	8.805	1.728	96
Caririaçu	1.472	99	460	409	182
Crato	7.871	655	974	590	347
Farias Brito	1.286	75	288	179	71

Jardim	4.219	698	384	214	92
Juazeiro do Norte	22.726	2.684	3.387	1.690	3.127
Missão Velha	4.551	1.115	804	578	69
Nova Olinda	741	89	81	53	40
Santana do Cariri	707	52	110	80	49
TOTAL	78.787	9.938	15.293	5.521	4073

Source: Prepared by the author based on data collected in hospitals

* **Note:** The HRC, through the Institute of Health and Hospital Management (ISGH), did not provide data on outpatient care provided.

It is evident that, in these three hospital units, the total number of services—adding outpatient and inpatient care—exceeded 110,000. As expected, each hospital receives the highest number of patients from its host municipality (HMSVP and Hospital Santo Antônio with most patients from Barbalha; HRC with most patients from Juazeiro do Norte).

By excluding the population residing in the municipalities where these facilities are located, a total of 60,207 patients from other cities sought care in one of these reference hospitals for outpatient or inpatient services.

It is also important to highlight that the broad attractiveness of these hospital units extends beyond the Cariri Metropolitan Region, reaching all of southern Ceará and neighboring areas of Pernambuco and Piauí. This is evidenced by the presence of patients from more than 70 municipalities in Ceará, over 30 in Pernambuco, and more than 20 in Piauí, as well as from other municipalities in states such as Paraíba, Bahia, and Alagoas.

The data support the findings of the study *Regions of Influence of Cities – REGIC 2018*, which identified Crajubar municipalities—grouped in that study under the “Population Arrangement of Juazeiro do Norte”—as key centers for accessing basic and medium-complexity healthcare services. The influence of these municipalities goes beyond the interior of Ceará and reaches neighboring states like Pernambuco, Paraíba, and Piauí.

In addition to medium-complexity services—which include “medical and dental services; clinical exams; orthopedic and radiological services; physiotherapy; and minor surgeries; among other services that do not involve hospitalization” (IBGE, 2020, p. 109)—the RMCariri, or more specifically Crajubar, also attracts people seeking high-complexity healthcare services.

Intrametropolitan flows for healthcare services are an important indicator of the provision of specialized services within a metropolitan region, as they help to understand

the metropolitan arrangement by identifying the service-providing hubs. It is worth noting that this indicator does not have significant influence on intrametropolitan migration but does affect commuting patterns.

According to Zaslavsky e Goulart (2017, p. 3892), who observed that migration and/or commuting for access to healthcare services is a common process worldwide, “many people travel to centers that are references for certain specialized services without permanently changing their municipality of residence.” When people perceive that the healthcare services offered are better than those in their own municipalities, they tend to use them regularly (Zaslavsky; Goulart, 2017). Moreover, the shorter the distance between metropolitan municipalities, the more intense the flow of people toward a health service hub tends to be.

These findings are consistent with other studies, such as Hermano, Palhares e Silva (2023), who analyzed commuting flows for access to healthcare services in the city of Montes Claros (MG), and confirmed that commuting for this purpose is frequent and often originates from small neighboring municipalities, whose residents seek medium- and high-complexity services in mid-sized cities.

In this context, the establishment of healthcare consortia has become more common, aligned with the guidelines of Brazil’s Unified Health System (SUS), which promotes inter-municipal partnerships to improve healthcare. As Zaslavsky e Goulart (2017, p. 3984) state:

[...] small municipalities can establish partnerships with larger municipalities that have more advanced medical technology so that their citizens may travel to these ‘functional health regions’ when needed and then return to their home municipalities.

In the case of RMCariri, the centrality of Crajubar municipalities—particularly Barbalha and Juazeiro do Norte—was confirmed. Barbalha stands out for its significant role in offering medium- and high-complexity services, as it hosts two of the region’s three largest hospitals and the first medical school in the area. Juazeiro do Norte has also advanced in offering these services through the construction of the Hospital Regional do Cariri and private investments in the sector. The other municipalities, with the exception of Crato, are small and have only basic healthcare infrastructure.

4.2 Intrametropolitan flows for access to higher education in RMCariri

Given the growing importance of RMCariri’s university hub—located almost entirely within Crajubar municipalities—this study sought to identify the municipalities of origin of



students enrolled in undergraduate programs at the region's main Higher Education Institutions (HEIs). The institutions selected, based on the number of undergraduate programs offered and total student enrollment, were:

- i) Universidade Regional do Cariri – URCA, a state-run institution with its main campus in the city of Crato (Campus Pimenta and Campus São Miguel), and additional campuses in Juazeiro do Norte (Campus CRAJUBAR) and Barbalha. It is the oldest HEI in the region and, until the early 2000s, was the only one. At the time of this study, it offered 18 undergraduate programs across its campuses in Crato and Juazeiro do Norte.
- ii) Universidade Federal do Cariri – UFCA, a federally funded institution with its main campus in Juazeiro do Norte and additional campuses in Crato and Barbalha. At the time of analysis, it offered 11 undergraduate programs: 9 in Juazeiro do Norte, and 1 each in the Crato and Barbalha campuses.
- iii) Centro Universitário Dr. Leão Sampaio – UNILEÃO, the largest private HEI in the region, offered 14 undergraduate programs across its three campuses in Juazeiro do Norte during the period under study.

In the first semester of 2017, URCA had 6,600 enrolled students from 57 cities in Ceará (including the nine municipalities of RMCariri), 17 in Pernambuco, 11 in Piauí, as well as from cities in Paraíba (1), Maranhão (1), Bahia (1), Rio Grande do Norte (1), and Amazonas (1), totaling 90 municipalities.

The institution's wide geographic reach underscores its regional importance, especially for neighboring states such as Pernambuco and Piauí. This broad appeal can be attributed to URCA's long-standing presence in the region, which, for many years, made it the sole HEI in Cariri—building its reputation and credibility in higher education.

Table 02 shows the number of students enrolled at URCA in the first semester of 2017 by municipality of residence within RMCariri. It reveals that of the 6,600 enrolled students in URCA's Crato and Juazeiro do Norte campuses, approximately 77.4% (5,113 students) were from RMCariri municipalities. Of those, 84.4% were from Crajubar.

Table 02 – Intrametropolitan origin in the Cariri Metropolitan Region of URCA students in 2017.1

Municipality	TOTAL
Barbalha	304
Caririaçu	123
Crato	2.207
Farias Brito	196
Jardim	134
Juazeiro do Norte	1.805
Missão Velha	85
Nova Olinda	145
Santana do Cariri	114
TOTAL	5.113

Fonte: Prepared by the author according to institutional records obtained from URCA

URCA's internal records did not provide enrollment figures per campus. However, as the institution's headquarters and the majority of its programs are based in Crato, it can be inferred that nearly 3,000 students commute from other municipalities within RMCari to attend classes, mostly in Crato. This estimate aligns with data from the 2010 IBGE survey on commuting flows, which recorded 3,028 students commuting to Crato for educational purposes (IBGE, 2010).

In the same semester (2017.1), Unileão had 6,456 enrolled students from 61 municipalities in Ceará (including RMCari), 24 in Pernambuco, 14 in Piauí, 8 in Paraíba, 4 in Bahia, 2 in Maranhão, and one in each of the following states: Alagoas, Pará, and Rio de Janeiro—amounting to 116 municipalities in total. This wide-ranging appeal reinforces Unileão's role beyond Ceará, particularly in the neighboring states of Pernambuco, Piauí, and Paraíba. The number of students from RMCari municipalities enrolled at Unileão is shown in Table 03.

Of Unileão's 6,456 students, 63% (4,070) were from RMCari. Crajubar municipalities—Crato, Juazeiro do Norte, and Barbalha—together accounted for 88.13% of this total, representing 55.55% of all enrolled students. Given that all three Unileão campuses are located in Juazeiro do Norte, approximately 1,735 students commute daily to attend classes in that city.

Table 03 - Intrametropolitan origin of Unileão students in the Cariri Metropolitan Region in 2017.

Municipalities	UNILEÃO – Campuses in Juazeiro do Norte
Barbalha	471
Crato	781
Caririaçu	104
Farias Brito	59
Jardim	98
Juazeiro do Norte	2335
Missão Velha	117
Nova Olinda	56
Santana do Cariri	49
TOTAL	4070

Source: Prepared by the author according to institutional records obtained from Unileão

In the first semester of 2017, UFCA had 2,768 enrolled students. Of these, 1,643 students from RMCari were enrolled in programs at Crajubar campuses. Students from all RMCari municipalities were enrolled in courses offered at the Crato (Agronomy) and Juazeiro do Norte campuses. At the Barbalha campus—home to UFCA’s Medical School—students from Farias Brito, Nova Olinda, and Santana do Cariri were not represented in the 2017.1 enrollment. Excluding students who resided in the same municipality as the campus, 716 students commuted within RMCari to attend UFCA courses. Table 04 presents these data.

Table 04 - Intrametropolitan origin of UFCA students in the Cariri Metropolitan Region in 2017.1

Municipality	UFCA			TOTAL
	Campus Crato	Campus Barbalha	Campus Juazeiro do Norte	
Juazeiro do Norte	52	61	820	933
Crato	45	28	361	434
Barbalha	5	62	86	153
Missão Velha	2	3	21	26
Farias Brito	8	0	18	26
Caririaçu	5	2	15	22

Jardim	5	2	11	18
Nova Olinda	2	0	16	18
Santana do Cariri	3	0	10	13
TOTAL	127	158	1358	1643

Source: Prepared by the author according to institutional records obtained from UFCA

Although UFCA had the smallest number of students among the three HEIs analyzed, it displayed the greatest national reach—attributable to its participation in the Ministry of Education's *Sistema de Seleção Unificada – SISU*, a centralized university admissions system for federal institutions. As a result, UFCA had students from 19 Brazilian states and the Federal District, including 66 cities in Ceará (including those in RMCari), 17 in Pernambuco, 9 in Paraíba, 7 in São Paulo, 6 in Minas Gerais, 5 in Piauí, 5 in Bahia, 4 in Maranhão, 3 in Rio Grande do Norte, 2 each in Alagoas, Mato Grosso do Sul, and Espírito Santo, and 1 each in Pará, Rio de Janeiro, Paraná, Federal District, Goiás, Amapá, and Tocantins.

Data from the region's leading HEIs confirm a significant number of students from multiple municipalities served by these institutions, along with intense intrametropolitan flows of students studying in municipalities different from their own within RMCari. In this context, it is worth noting that:

[...] attending higher education is a dynamic process related, on one hand, to the availability of higher education institutions in various Brazilian cities and, on the other hand, to the population's ability to commute and afford the costs associated with their studies (IBGE, 2020, p. 98).

Unlike access to healthcare services—where intrametropolitan migration is less common—pursuing higher education often results in permanent relocation. This typically involves a cost-benefit analysis regarding expenses and available opportunities.

Driven by the indicators of Crajubar, RMCari has emerged as one of Brazil's higher education hubs, particularly in the Northeastern hinterlands, as highlighted in the REGIC 2018 report (IBGE, 2020). This trend mirrors national developments in the expansion of higher education in mid-sized cities. The rise of RMCari as a higher education center is explained by the growth of URCA's course offerings, the creation of UFCA, and increased private investments in colleges and university centers such as Unileão.

Within this scenario, Juazeiro do Norte has overtaken Crato as the region's primary reference in higher education. This shift can be attributed to the presence of UFCA and the region's main private HEIs in Juazeiro do Norte.

These findings are consistent with studies such as Silva *et al.* (2018), which analyzed spatial organization and the centrality of higher education services in the Metropolitan Region of Salvador (RMS), highlighting strong intrametropolitan disparities and service concentration—particularly in Salvador.

Regarding healthcare-related flows, the findings are also in line with Zaslavsky e Goulart (2017), who demonstrated that commuting movements occur both toward mid-sized cities and within metropolitan areas toward central hubs. In many cases, people travel specifically or sporadically for healthcare services. It is important to emphasize that “The so-called population surplus resulting from commuting movements is rarely considered in funding allocations and public policy planning, leading to excess demand compared to available healthcare services (Zaslavsky e Goulart, 2017, p. 3893).”

In a broader sense, Nowotny (2010), when analyzing commuting patterns in Austria across multiple variables, highlighted the importance of local public goods. In the original, he refers to them as “*local public goods*,” particularly emphasizing the availability of services in educational and healthcare institutions.

5 FINAL CONSIDERATIONS

The analysis revealed that intrametropolitan flows within RMCari are undergoing a process of consolidation—much like the metropolitan region itself. As anticipated, the municipalities of Juazeiro do Norte, Crato, and Barbalha emerge as the primary destinations for individuals seeking healthcare and higher education services within this metropolitan framework. This predominance is largely explained by the relative size and institutional infrastructure of these municipalities, which concentrate the main hospitals and higher education institutions in the region.

The findings allow us to conclude that, although RMCari has progressed in terms of metropolitan integration, significant structural challenges persist—particularly regarding the decentralization of services and the reduction of territorial inequalities. The evidence demonstrates that Crajubar municipalities—especially Juazeiro do Norte—are focal points for intermunicipal flows tied to the demand for specialized services. This pattern reflects a broader national trend of consolidating such services in mid-sized urban centers.



In this context, future research should seek to correlate intrametropolitan flows for access to healthcare and higher education with data on intrametropolitan migration, in order to confirm or refute the existence of a relationship between these phenomena. Furthermore, comparative studies encompassing different time periods are recommended, so as to monitor the evolution of these flows and better understand the dynamics of the metropolitan arrangement in question.

NOTICE

This paper was adapted and updated from the doctoral thesis in Geography, entitled “Ser-Tão “metropolitano”: especialidade e institucionalidade na Região Metropolitana do Cariri” defended by the author at the Federal University of Pernambuco (UFPE).

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