




GEOGRAPHY OF HEALTH: AN INTEGRATIVE REVIEW OF CONTEMPORARY SCIENTIFIC PRODUCTION

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ABSTRACT

Health Geography is an interdisciplinary area that investigates the relationship between health, space, and territory, contributing to understanding health inequalities and guiding public policies. This study carried out an integrative review with the objective of identifying theoretical, methodological and thematic approaches predominant in recent scientific production on Health Geography. We analyzed 18 articles published between 2014 and 2024, extracted from the CAPES Journal Portal, SciELO, LILACS, and VHL databases, selected according to specific criteria. The results were organized into four emerging categories: (1) social determinants of health, (2) spatial distribution of diseases, (3) public policies and health in the territory, and (4) environmental health and epidemiological surveillance. The studies highlighted the use of geospatial tools to map disease patterns, highlighting climatic, socioeconomic, and environmental factors associated with health. Gaps were also identified, such as the excessive centralization of public policies, which disregards local specificities, and the need for greater integration between critical methodologies and territorial approaches. It is concluded that Health Geography has advanced in the use of spatial analysis and technological tools, but still faces challenges in the integration of local knowledge and in the decentralization of public policies. This paper highlights the importance of an interdisciplinary and territorialized approach to address health inequalities and improve the planning of preventive and interventional actions.

Keywords: Health Geography. Epidemiological Surveillance. Social Determinants of Disease.

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INTRODUCTION

The Geography of Health corresponds to emerges as an interdisciplinary field that encompasses issues related to the complex interactions between geographical, social, and environmental factors and the processes of health and disease. The interests of this area focus on inequalities in access to and quality of health care, prevalence of infectious diseases, distribution of health services and policies, as well as other social, economic, and political impacts on public health (Pereira, 2021).

Over the last decades, this area has been consolidated in terms of theoretical-methodological and intervention. This interest and development in the area is associated, above all, with the development of the Unified Health System (SUS) in Brazil, as well as with the understanding that it is not possible to think about the health-disease process without considering the influence of social, economic and territorial factors (Porto; Gurgel; Cato, 2022). The spatial analysis of health conditions makes it possible to identify epidemiological patterns, assess social determinants of health, access to services, distribute resources, and socioeconomic conditions (Barcellos *et al.*, 2018; Pereira, 2021).

Despite the growing interest of scientific productions on the subject in recent years, efforts to integrate and systematize knowledge and methodological, theoretical, and intervention approaches continue to be necessary. Thus, this article is interested in answering the following question: what are the main approaches and thematic trends identified in recent scientific production on Health Geography, and how have these approaches contributed to the understanding of the relationships between health, space and territory?

Thus, this article aims to carry out an integrative review of the scientific production on Health Geography, identifying the main approaches, emerging themes and research gaps. Based on the critical analysis of studies published in recent years, it seeks to offer an overview of how Health Geography has contributed to the understanding of the relations between health and territory, in addition to pointing out possible paths for future investigations. This work aims to contribute to the consolidation of the field, promoting a dialogue between the various theoretical and methodological strands, and highlighting the role of Geography in health promotion and in the reduction of social and territorial inequalities.

METHODOLOGY

This study deals with an integrative literature review, a methodological approach that enables the synthesis of the knowledge produced on a given topic, integrating results from theoretical and empirical studies in order to understand the state of the art of a field of research (Dantas *et al.*, 2022). The review was conducted in accordance with the steps suggested by Mendes, Silveira and Galvão (2008), covering the formulation of the research problem, definition of inclusion and exclusion criteria, selection and analysis of studies and synthesis of research findings.

The research problem that guided this review was: What are the main thematic approaches and trends in recent scientific production on Health Geography? The objective was to identify emerging themes, contributions and gaps in studies published in recent years. The searches were carried out between August and November 2024 in the following databases: CAPES Journal Portal, SciELO (Scientific Electronic Library Online), LILACS (Latin American and Caribbean Literature on Health Sciences) and VHL (Virtual Health Library).

Descriptors in Portuguese, English, and Spanish were used to expand the coverage of the search. The terms were selected from keywords frequently used in the literature in the area, combined with Boolean operators (AND, OR) to refine the results. The search included the following combinations: a) combination 1: ("Health Geography" OR "Health Geography") AND ("health and territory" OR "social determinants of health"); b) combination 2: ("Space and health") OR ("spatial distribution" AND "epidemiology").

The following inclusion criteria were adopted: articles published in peer-reviewed journals between 2014 and 2024; studies available in full in Portuguese, English or Spanish; research that explicitly discusses the relationship between health, territory and geographic space; theoretical, empirical or review studies with application in Health Geography.

The exclusion criteria applied were: studies with an exclusively clinical or biological focus with no connection to territorial aspects; reviews, editorials and opinion articles; duplicate studies in the consulted databases, and only one version was considered for analysis.

The process of selecting the studies followed four stages: in the initial search phase, the articles were identified based on the defined keywords and filters applied in

each database. Subsequently, the screening phase involved reading titles and abstracts to eliminate studies that did not meet the inclusion criteria. The full reading phase covered the detailed analysis of the full texts to ensure eligibility. Finally, the final inclusion phase included the organization of the selected articles in a synoptic table for critical analysis and categorization.

The search resulted in an initial total of 139 articles, of which 113 were excluded after reading titles and abstracts. The articles were excluded mainly because: (a) focus outside the health-space relationship, covering general themes of the public health or education relationship; (b) emphasis on specific tools or methodologies, such as digital platforms or pedagogical tools, without directly discussing spatial or theoretical dynamics of Health Geography. After reading it completely, 18 articles were included in the final review.

The included articles were analyzed qualitatively, with the objective of identifying the main theoretical, methodological and thematic approaches. The data were organized into emerging categories, such as social determinants of health, spatial distribution of diseases, public policies, and health in the territory, among others. These categories were discussed in the light of the proposed objective, highlighting advances, gaps and trends in the area.

As this is a literature review, this study did not involve the collection of primary data or human subjects, eliminating the need for approval by ethics committees. Transparency and reproducibility guidelines were followed, ensuring fidelity to the studies analyzed.

RESULTS

The analysis of the 18 articles selected for this integrative review (Chart 1) allowed us to identify theoretical-methodological and thematic approaches that predominate in recent scientific production on Health Geography.

Table 1. Studies selected in the review

Title	Authorship	Objective	Methodology	Theme
The geography of health in Brazil: state of the art and some challenges	Mendonça, Araújo and Fogaça (2014)	To examine the state of the art of Health Geography in Brazil and identify challenges.	Literature review and theoretical analysis on the advances and challenges of the field.	The evolution of Health Geography and its challenges in Brazil.
Teaching and research in Health Geography in Europe, Africa and Latin America	Mendonça and Handschumacher (2015)	To develop a state of the art of teaching and research in Health Geography at an international level, with a focus on Latin America, Africa and Europe.	Analysis of data obtained from international seminars and answers to questionnaires applied to participants of the event, in addition to literature review.	Teaching and research in Health Geography in international contexts
Geostatistical modeling of dengue cases and thermopluviometric variation in João Pessoa, Brazil	Silva <i>et al.</i> (2015)	OBJECTIVE: To investigate the climatic factors associated with dengue incidence in João Pessoa between 2007 and 2011.	Geostatistical analysis using data on precipitation, relative humidity and dengue cases.	Relationship between climate and dengue incidence.
Field itineraries in Health Geography in the municipality of Campina Grande – PB and surrounding municipalities	Silva and Pereira (2015)	Use geographic knowledge to create field itineraries that identify elements of health promotion, prevention and risk in Campina Grande and surroundings.	Application of forms, survey of references, visit itineraries, implementation of database and organization of thematic maps with geoprocessing.	Health promotion and prevention in Campina Grande and surrounding areas
Geography and health: the place as a premise of the informational activity of Primary Care of the Unified Health System	Dantas and Curious (2016)	Discuss the importance of place as an essential variable in health informational activity.	Qualitative analysis based on literature review and observations on the SUS.	Health information and territoriality.
Geography and collective health in Brazil	Guimarães (2016)	To reflect on the contribution of geography to public health in Brazil.	Narrative review of literature on geoprocessing and health.	Interaction between geography and public health.
Geography of health: context of waterborne diseases in the Boa Hora River basin, MA	Conceição and Rodrigues (2017)	To identify waterborne diseases in the villages of the Boa Hora River basin, MA.	This is a descriptive and analytical study with the application of questionnaires and the use of secondary data.	Problems related to water quality and basic sanitation.
Changing labour market conditions during the 'great recession' and mental health in Scotland (2007–2011)	Curtis <i>et al.</i> (2018)	Explore the impact of local economic conditions on mental health in Scotland during the recession.	Longitudinal analysis using data from the Scottish Longitudinal Study and trajectory models.	Economic impacts on mental health.
'Walk like a penguin': Older Minnesotans'	Finlay (2018)	Explore how white spaces (snow and	Qualitative interviews and	Positive and negative



experiences of (non)therapeutic white space		ice) affect the well-being of older adults.	participant observation with older adults in Minnesota, USA.	impacts of white spaces on the well-being of older people.
Geography of Health: A study on malaria in the urban area of São João da Baliza-Roraima	Silva e Silva (2019)	To analyze the environmental and socioeconomic factors that influence the transmission of urban malaria in the Universo neighborhood, in São João da Baliza.	This is a descriptive study with epidemiological data collection (SIVEP-Malaria) and field observation using technologies such as drones and GIS for the analysis of environmental and social factors.	Urban malaria and environmental and social determinants in the Universo neighborhood
The characteristics of Health Geography in Brazil: A bibliometric analysis of scientific production in the period 2012-2019	Anute, Paula and Farias (2021)	To analyze the characteristics of Brazilian scientific production in Health Geography, considering themes, approaches and regional distribution of publications in the journal Hygeia.	Bibliometric review of articles published in the journal Hygeia between 2012-2019, with data organization in graphs for quantitative and qualitative analysis.	Scientific production in Health Geography in Brazil
From social determinants to social epigenetics: Health geographies of chronic disease	Shantz and Elliott (2021)	To examine the integration of social epigenetics and health geographies in the study of chronic diseases.	Theoretical review on epigenetics, social inequalities and gender.	Social epigenetics and chronic health.
Geography of health inside and outside geography	Pereira (2021)	Understand how Health Geography is classified and influenced by other sciences.	Bibliographic survey, literature review and comparative analysis.	The classification and interdisciplinarity of Health Geography.
The contributions of Health Geography in vector monitoring: Possibilities and challenges in times of pandemic - COVID-19	Oliveira, Fernandes e Silva (2022)	Socialize and discuss the monitoring of vectors (arboviruses) and their interactions with Health Geography in the context of the COVID-19 pandemic.	Vector monitoring (ovitrap) and social mobilization activities in partnership with different institutions, integrating popular education and social networks.	Monitoring of arbovirus vectors in times of pandemic
From the functional ratio between environment and health to other epistemologies in Health Geography from the resistance of popular knowledge	Clarindo and Nabozny (2022)	Discuss alternative approaches in the Geography of Health, incorporating popular knowledge and precepts of decolonial thought.	Review of Brazilian theses/dissertations between 1987-2018 using word clouds and data analysis via software.	Other epistemologies in the Geography of Health
Spatial distribution of risk factors and fluoride levels in public water	Magalhães <i>et al.</i> (2022)	OBJECTIVE: To evaluate the spatial distribution of fluoride	Analysis of secondary environmental and	Environmental health surveillance

supply at the municipal scale		in water and risk factors in municipalities of Ceará.	socioeconomic health data.	and fluoride in water.
Modeling of Dengue by Cluster Analysis and Probability Distribution Functions in the State of Alagoas in Brazil	Oliveira-Junior <i>et al.</i> (2023)	To characterize the spatiotemporal patterns of dengue in Alagoas.	Cluster analysis and probability distribution functions.	Spatio-temporal dynamics of dengue.
Geography and public health: analysis of the epidemiological dynamics of meningitis in Brazil, between 2010 and 2019	Silva <i>et al.</i> (2024)	To analyze the spatio-temporal epidemiological dynamics of meningitis in Brazil (2010-2019).	This is a descriptive ecological study with statistical and spatial analysis of SINAN data.	Epidemiology of meningitis in Brazil in relation to space and time.
The territoriality of high complexity in the Metropolitan Region of Belém, Brazil	Prose A Rocha (2024)	To analyze the performance of the high complexity health network in the Metropolitan Region of Belém.	Analysis of secondary data from CNES and georeferencing.	The relationship between territoriality and high complexity health.

Source: prepared by the author.

The scientific production on Health Geography highlights several predominant themes that reflect interdisciplinarity, emerging challenges, and the evolution of the field in Brazil and in international contexts. Among the themes, they include the evolution, epistemology and interdisciplinarity of Health Geography, the socio-spatial dynamics of diseases and environmental factors, the interrelationships between health, territoriality and health promotion, the mental health and well-being of populations, emerging issues and technological advances, and basic sanitation, water quality and environmental health.

DISCUSSION

The data were organized into four emerging categories: (1) social determinants of health, (2) spatial distribution of diseases, (3) public policies and health in the territory, and (4) environmental health and epidemiological surveillance.

SOCIAL DETERMINANTS OF HEALTH

The social determinants of health emerge as a central category in the Geography of Health, standing out for the analysis of socioeconomic inequalities and their impact on the health of populations and territories. Studies such as those by Anute, Paula, and Farias (2021) show that neglected diseases such as dengue, visceral leishmaniasis, and leprosy predominate in socioeconomically disadvantaged areas in Brazil. The

authors also highlight the concentration of publications in the Southeast and South regions, in contrast to gaps in the North and Northeast regions. These regional inequalities and the invisibility of certain populations demand greater academic and political attention.

The integration of decolonial epistemologies for the analysis of social determinants is highlighted in the work of Clarindo and Nabozny (2022), who propose the valorization of popular knowledge and local practices. The authors state that these epistemologies broaden the understanding of inequalities, deconstructing logocentric approaches and promoting a broader and more contextualized view. This perspective also points to the need to incorporate the intersectional dimensions of gender, class, and ethnicity as guiding factors in the analysis of social determinants, an aspect that has not yet been explored in the literature, as also emphasized by Anute, Paula, and Farias (2021).

Evidence of social inequality is further reinforced by specific case studies. Nunes, Leite, and Carvalho (2020) analyzed the distribution of COVID-19 infections in Uberlândia, demonstrating that neighborhoods with per capita income below one minimum wage had the highest contamination rates. Additionally, Gragnani (2020) highlights that black and peripheral populations face structural barriers to accessing health services, due to the inadequate location of health equipment and poor basic sanitation conditions. These factors exemplify how the interaction between social and environmental conditions generates avoidable inequities.

On the other hand, studies such as Finlay's (2018) explore the interaction between environmental factors and health, showing that social vulnerabilities also manifest themselves in specific contexts, such as in regions with snow and ice. In these areas, older people face social isolation and mobility barriers, highlighting the interrelationship between environment, physical health, and mental health.

In addition, the relationship between social inequalities and access to health is addressed by Pereira (2021), who points to the need to incorporate multidisciplinary aspects into geographic analyses. The interaction between social and environmental determinants is seen as necessary to understand health outcomes and propose more effective interventions. Previous studies, such as Brasil (2018), reinforce the persistence of neglected diseases in vulnerable populations and the need for policies that promote equity in health and social justice.

Thus, the social determinants of health are configured as a lens to understand the distribution of health inequalities, especially in contexts historically marked by social exclusion. Incorporating intersectional and decolonial approaches, as well as broadening the focus to underrepresented regions, are steps to fill research gaps and foster more inclusive policies.

SPATIAL DISTRIBUTION OF DISEASES

The spatial distribution of diseases was a topic addressed in the studies analyzed on Health Geography, with emphasis on the use of geotechnologies and spatial analysis to identify epidemiological patterns. The reviewed studies highlight how environmental, social, and climatic factors influence the spread of disease, as well as pointing out gaps in epidemiological planning and surveillance.

The work of Silva *et al.* (2015), which investigated urban malaria in São João da Baliza, Roraima, demonstrated that the proximity of streams to urban housing is a determining factor for the high incidence of cases of the disease. This finding indicates how environmental elements are directly related to disease transmission in urban areas. The geographic analysis used by the authors also reveals specific vulnerabilities and points to the need for public policies focused on mitigating environmental factors associated with the disease.

In addition, Oliveira, Fernandes, and Silva (2022) addressed dengue during the COVID-19 pandemic, using ovitraps and geographic technologies for epidemiological monitoring. The authors highlighted that the integration of low-cost methods with community engagement, mediated by social networks, has great potential for epidemiological surveillance, especially in resource-limited contexts.

In the case of Silva and Silva (2019), the spatial dynamics of malaria transmission were analyzed in relation to factors such as proximity to water bodies and poor housing conditions. The study identified patterns of vulnerability in the investigated neighborhood, demonstrating the importance of geoprocessing tools and SIVEP-Malaria data to understand how urban occupation influences epidemiology.

Other studies extend this perspective to diseases related to the absence of basic infrastructure. Conceição and Rodrigues (2017) investigated the prevalence of diseases such as cholera, amoebiasis, and diarrhea in communities without basic sanitation. The spatial analysis associated the occurrence of these diseases with the proximity of

contaminated water sources, reinforcing the importance of articulating epidemiological surveillance with sanitary interventions in vulnerable regions.

The relevance of spatial analysis is also highlighted by Silva and Pereira (2015), who used thematic mapping to identify elements of health promotion, prevention, and risks in specific areas. This study demonstrates how the integration of geotechnologies into territorial health planning can guide more precise and effective actions to address the problem.

Finally, approaches that consider climatic factors were mentioned by some of the studies consulted. Silva *et al.* (2015) highlighted how precipitation and humidity influence the incidence of dengue in João Pessoa. Geostatistical analysis methods were used to map risk patterns, guiding more targeted control measures. Similarly, Khormi and Kumar (2011) used geographic information systems (GIS) to correlate dengue distribution with socio-environmental factors, showing the versatility of these tools to monitor everything from tropical diseases to global epidemics, such as COVID-19.

The integration of demographic, environmental, and climatic data in the analyses proved essential for understanding the spatial distribution of diseases. However, significant gaps persist, such as the need for greater articulation between spatial analysis and public policies, as well as the deepening of the use of geotechnologies in regions underrepresented in the studies, such as the North and Northeast of Brazil.

PUBLIC POLICIES AND HEALTH IN THE TERRITORY

The analysis of studies on public health policies highlighted the centrality of territoriality in the formulation of strategies to cope with diseases and promote health. The revisited literature demonstrates that the absence of a territorial approach and the centralization of decisions compromise equity in access and quality of health services.

Dantas and Curioso (2016) point out that the centralization of information in the Unified Health System (SUS) neglects regional specificities, making interventions difficult for local teams. The authors emphasize that health is, in essence, a regional phenomenon, which requires strategies that integrate decentralization and regionalization. This criticism is echoed in the work of Mendonça, Araújo and Fogaça (2014), who highlight the importance of incorporating the territorial dimension into public

policies to understand flows, networks and the structural inequalities that shape health services.

The role of public policies in mitigating regional inequalities is also addressed by Narvai et al. (2014), who analyzed the control of water fluoridation. The authors identified that the North and Northeast regions face inequalities due to insufficient implementation of these policies, while the South and Southeast benefited from more robust investments. This disparity underscores the need for more in-depth geopolitical diagnoses capable of capturing local realities.

Studies such as those by Godoy and Rocha (2024) reinforce that the unequal distribution of high-complexity services compromises access to health in municipalities far from large urban centers. Although the SUS network depends on state subsidies to integrate private services, this integration has not been sufficient to overcome territorial barriers. These findings underline the urgency of policies that promote universal access in territories marked by inequality.

The global dimension of health policies is explored by Mendonça and Handschumacher (2015), who discuss the role of Health Geography in countries of the Global South. They highlight the historical and structural barriers that hinder the implementation of regional solutions, especially in African and Latin American countries. The study points out that academic networks can contribute to addressing these inequalities, as long as regional and cultural specificities are considered.

ENVIRONMENTAL HEALTH AND EPIDEMIOLOGICAL SURVEILLANCE

Environmental health emerged as the main theme in the studies analyzed, especially with regard to water quality, basic sanitation and the impact of environmental factors on the occurrence of waterborne diseases and arboviruses. The studies highlight the importance of integrating environmental, social, and technological approaches to understand vulnerabilities and plan effective and territorially contextualized interventions.

Conceição and Rodrigues (2017) highlight the direct relationship between the absence of basic sanitation and the increase in the prevalence of diseases such as cholera and amoebiasis in the Boa Hora River basin, in Maranhão. The lack of adequate infrastructure is identified as one of the main risk factors in vulnerable areas, evidencing the need for public policies aimed at sanitation and water management.

In the urban context, Silva *et al.* (2015) explored urban malaria and demonstrated that environmental factors, such as riparian vegetation and the proximity of water bodies to urban areas, are determinants for the proliferation of the *Anopheles* vector. The research emphasizes the need for specific vector control actions, considering the environmental aspects that favor mosquito reproduction.

Silva and Silva (2019) expanded this perspective by proposing the use of GIS to monitor and plan interventions in vulnerable areas. Integrating environmental and social analyses, the authors highlight that climatic characteristics and proximity to water bodies are elements to be considered in epidemiological surveillance and disease control.

Conceição and Mendonça (2017) reinforce the need for attention to territorial planning and water resources management, highlighting how the inappropriate use of these resources contributes to the spread of waterborne diseases. They point out that environmental health needs to be a priority in public policies that seek to minimize the impacts of water-related diseases.

Epidemiological surveillance was widely addressed as a strategy to promote environmental health. Anute, Paula, and Farias (2021) highlighted the importance of integrating geospatial data to identify critical areas of vulnerability. The authors argue that more detailed approaches, which consider social and territorial aspects, can increase the effectiveness of public health interventions.

In this sense, Oliveira, Fernandes, and Silva (2022) presented a practical example of the use of ovitraps as a tool for monitoring arboviruses, such as dengue and zika. The strategy, in addition to being low-cost, proved to be replicable even during the COVID-19 pandemic, a period in which mobility restrictions required the adoption of digital alternatives. Community mobilization, mediated by social networks, was highlighted as a valuable resource for participatory surveillance and engagement of the population.

The studies analyzed converge on the need to strengthen epidemiological surveillance as a necessary tool for environmental health. The integration between traditional and innovative methodologies, combined with detailed territorial analyses, emerges as a promising approach to address complex challenges and promote greater equity in public health.



CONCLUSION

The present integrative review revealed that Health Geography is an interdisciplinary field in rapid expansion, which contributes to the understanding of the complex relationships between health, space and territory. The analysis of studies published in recent years reveals the centrality of approaches that combine critical analysis with technological tools to address challenges such as regional inequalities, social vulnerabilities, and barriers in the implementation of public policies.

The results highlight important advances in the use of geotechnologies, such as GIS, to map vulnerabilities, plan interventions, and monitor diseases. This technological integration, combined with the valorization of local knowledge, offers promising paths for the construction of more equitable and effective public policies. However, significant gaps persist, such as the underrepresentation of the North and Northeast regions in studies and the absence of intersectional analyses that address specific social determinants, such as gender and ethnicity.

Despite the advances, the integration between public policies and territoriality remains a challenge, reinforcing the urgency of more detailed regional diagnoses and decentralization strategies that respect local specificities. Methodological limitations were also identified, with emphasis on the scarcity of investigations that articulate social determinants, such as race, class, and gender, with spatial analysis.

To strengthen the field of Health Geography, future investigations should prioritize the development of methodologies that integrate technological tools and critical social analysis. In addition, studies that focus on the intersectionality of social determinants in specific territorial contexts, as well as the creation of international networks to share experiences and promote the exchange of geographic knowledge applied to health.

Health Geography, as a multidisciplinary field, has the potential to mitigate health inequalities and promote social justice with public policies and control agencies. Its ability to articulate social, environmental, and political dimensions from a territorial perspective constitutes the necessary pillars to contribute to facing contemporary challenges in public health.



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