



Perspectives on urban mobility in promoting physical activity in the context of commuting in Brazil

Perspectivas sobre mobilidade urbana na promoção da atividade física no contexto dos deslocamentos no Brasil

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ABSTRACT

Despite Brazil's important advances in regulatory aspects related to city planning, the disorderly growth of Brazilian cities makes it difficult to implement changes that would result in greater opportunities for the active commuting of the population. This essay was designed to reflect on opportunities for improvement in the urban environment to promote physical activity in the context of commuting in Brazil. From this perspective, the study identified policies that promote orderly growth and support active commuting in cities. It also suggested the use of indicators to evaluate and monitor development, with a particular emphasis on active commuting. Furthermore, it is essential to adapt and improve the urban planning process to meet the needs of Brazilian municipalities and foster closer collaboration with civil society. Thus, it will be possible to verify the changes in the urban environment and their impact on the active commuting, promoting the development of healthy and sustainable cities.

Keywords: City planning; Healthy city; Built environment; Active mobility; Commuting.

RESUMO

Apesar do Brasil apresentar importante avanço em aspectos regulatórios relacionados ao planejamento das cidades, o crescimento desordenado das cidades brasileiras dificulta a realização de mudanças que reflitam em maiores oportunidades no deslocamento ativo da população. Este ensaio foi elaborado com objetivo de refletir sobre as oportunidades para melhorias no ambiente urbano para a promoção da atividade física no contexto do deslocamento no Brasil. Nessa perspectiva, o estudo identificou políticas que permitem o crescimento ordenado e favoreça o deslocamento ativo nas cidades, além de sugerir o uso de indicadores para avaliação e monitoramento do desenvolvimento, com especial foco no deslocamento ativo. Ademais, é imprescindível que o processo de planejamento urbano seja adaptado e aprimorado considerando as necessidades dos municípios brasileiros e com aproximação da sociedade civil. Assim, será possível verificar as modificações no ambiente urbano e seu impacto no deslocamento ativo da população, estimulando a criação de cidades saudáveis e sustentáveis.

Palavras-chave: Planejamento de cidades; Cidade saudável; Ambiente construído; Mobilidade ativa; Deslocamento.

Introduction

Physical activity has been recognized as a crucial element in promoting, preventing, and managing non-communicable chronic diseases and premature mortality¹. The literature highlights numerous benefits for individuals who engage in physical activity. However,

studies consistently show that a significant portion of the population has reduced levels of physical activity². Thus, considering the context of public health, it is extremely important to promote interventions that effectively encourage physical activity among different population groups³.

Among the available interventions, manipulating environmental factors is seen as promising for promoting physical activity. This is because the presence, availability, quality, and other characteristics of structures can encourage adherence to a more active lifestyle³. Urban environmental changes, despite being more expensive from a financial standpoint compared to other interventions, have the potential to benefit a large portion of the population and play a crucial role in creating pleasant, organized, and well-structured living spaces³.

Physical activities performed during commuting, such as walking and cycling, are more influenced by environmental conditions and account for approximately one-third of total physical activity in low- and middle-income countries⁴. Despite this contribution, the proportion of Brazilians who are actively engaged in physical activity has decreased in recent years⁵. In this sense, studies have indicated that characteristics of the urban environment, such as residential and commercial density, diversified land use, walkability indicators, street paving, aesthetics, and safety, are associated with physical activity during commuting⁶. Even in the face of this evidence, promoting physical activity through changes in the urban environment still encounters several barriers⁴. For example, even though it is widely recognized that the urban environment has a direct impact on people's daily lives and, consequently, on the overall health of the population, the management and planning of cities is often conducted by professionals who lack training in the field of health. Most managers are professionals trained in the fields of architecture, urbanism, engineering, and politics. In this way, health professionals, including Physical Education professionals, among others, need to have a better understanding of the urban planning and management process. This will enable them to contribute more effectively to the development of cities that promote physical activity.

Objective

This essay aims to reflect on opportunities for improving the urban environment to promote physical activity in the context of commuting in Brazil. Therefore, the text is structured into three parts: 1) an analysis of how planning and urban management occur in Brazil and the potential influencing factors; 2) the presentation of indicators that can be utilized to assess the implementation of environmental changes in cities that promote active commuting; and 3) the identification

of opportunities for action to enhance the urban environment.

Urban planning and management

The growth of the urban population, which is higher than that of the rural population, is a worldwide phenomenon that began decades ago and continues to intensify. In Brazil, the most recent estimates indicate that approximately 85% of the population lives in urban areas, which corresponds to around 68 million inhabitants residing in urban centers with more than 500,000 people⁷. These data reinforce the potential of environmental interventions that promote and encourage active mobility in large cities to reach a significant portion of the population and increase physical activity at the population level³.

In Brazil, the discussion about urban planning is recent, and for many years cities grew without any planning⁸. However, it is essential that cities are strategically planned and structured to support the use of active modes of transportation whenever possible, regardless of an individual's stage of life. In this way, planning is essential, as the haphazard growth of cities makes it increasingly difficult to implement alterations and changes.

However, significant progress in the planning and management of cities in Brazil has occurred since the 1980s, largely driven by several legislative frameworks, including the Federal Constitution (1988), the City Statute (2001), the Master Plan (2005), and the National Urban Mobility Policy (2012).

Prior to the 1988 Federal Constitution, urban planning was not mandatory and was not even considered as a guiding instrument for city development. It was only occasionally carried out in some cities. In this way, the 1988 Constitution brought about important advances through articles 182 and 183. These advances included the autonomy of municipalities in urban development and expansion, as well as the requirement for a Master Plan for cities with more than 20,000 inhabitants. These two articles were regulated by Law 10,257, also known as the City Statute⁹, in 2001.

The City Statute⁹ guides the use of urban property in favor of the collective good, security, citizens well-being, and environmental balance. It also establishes guidelines for urban development, including transportation and urban mobility. Among the instruments instituted by the City Statute to promote urban development, the Master Plan¹⁰ stands out. This plan aims to establish fundamental requirements for urban

property ordering, to ensure that the population's needs are met in terms of quality of life, social justice, and the development of economic activities. The plan allows for the political, dynamic, and participatory process of planning and administering cities, democratizing access to infrastructure, urban equipment, public spaces, and urban mobility.

The Master Plan is mandatory for cities with more than 20,000 inhabitants, metropolitan regions, urban agglomerations, areas of tourist interest, areas of influence of undertakings or activities with significant environmental impact, and cities with areas susceptible to the occurrence of environmental disasters¹¹. The preparation of the plan is the responsibility of the municipal executive power, a technical and interdisciplinary team. Since it is a participatory process, it is important to involve different sectors, as well as civil society. The Master Plan involves, among its various stages, the collection of data on the municipality, diagnosis of reality, definition of agendas and priorities, presentation of proposals, consultations, public hearings, conferences, and technical councils. As a final step, the document must be approved by the legislature. Once approved, it must be implemented, managed, and potentially adjusted, considering the evolving city dynamics and the political-administrative context in which the municipality is situated.

Approximately a decade after the Statute of Cities implementation, the National Urban Mobility Policy was instituted through the Urban Mobility Law (12,587/12)¹². This law aims to integrate different modes of transportation to improve accessibility and mobility for people. Through this policy, municipalities were compelled to develop a Master Plan with the aim of presenting an urban mobility plan that prioritizes non-motorized modes of transport and collective public transport. The Urban Mobility Plan must be integrated into or included in the Master Plan, and both plans must be reviewed every ten years by the Legislative and Executive powers of the municipalities. Furthermore, it is the responsibility of these levels of authority to promote access to public documents, public hearings, and debates with the participation of the population for the development, implementation, and oversight. This is a critical moment for organized civil society to articulate their demands and take corrective actions to address their needs. By doing so, they can contribute to enhancing the urban context through democratic governance and ensuring that the collective interest takes precedence.

However, ideal urban planning focuses on interventions that may not always be immediately visible. There is a long way to go from the creation of a public policy to its effective implementation. The actions required for the implementation of Urban Mobility Plans involve interventions in complex areas such as transport systems, changing population behavior, and addressing their impact on health conditions. Thus, it is necessary that the evaluation of the policy implementation process not be limited to indicators that only reflect the immediate effects of public policies, such as the use of transport modes, behaviors, and health outcomes.

Indicators for evaluating interventions to promote active commuting

In this context, it is crucial to evaluate certain short and medium-term indicators to determine the effectiveness of these interventions and their alignment with the recommended planning. *The Lancet* launched two special series, in "Urban Design, Transport, and Health," in 2016 and 2022, emphasizing the importance of proper monitoring in creating cities that promote health. In particular, as we move forward in the discussion of urban planning and transportation policies aimed at fostering the transition to healthy and sustainable cities, it becomes imperative to consider indicators that are already being evaluated and successful strategies for active commuting¹⁵.

From this perspective, the present essay focuses on two groups of indicators for evaluating and monitoring the progress toward creating healthy and sustainable cities, with a special emphasis on active commuting. These indicators include: 1) political indicators that are related to the existence of documents and laws addressing urban development demands; and 2) spatial indicators that aid in monitoring urban design demands by measuring its physical characteristics.

Identification of opportunities for improvement in the urban environment

In Brazil, the process of urbanization has been characterized by uncontrolled growth and the excessive value placed on urban centers. This movement led workers in cities to relocate their homes to peripheral areas, resulting in long daily commutes to work. As a result, these areas experienced growth and expansion, with private cars taking center stage, at the expense of non-motorized transportation.

Such challenges underscore the need for improved

Table 1 – Main political and spatial indicators related to active commuting proposed in The Lancet journal series on urban design, transport, and health¹²

Legislation/Policies and Government Investment in Transport	Description
1. Integrated transport and urban planning	- National and state transport and urban planning legislation requires integrated transport and urban planning actions.
2. Air pollution	- National and state air pollution legislation seeks to protect and improve air quality (involves policies related to air pollution by transportation planning).
3. Destination accessibility	- National and state transport and urban planning legislation requires coordinated planning of transport, employment, land use, and infrastructure that ensures access by public transport.
4. Distribution of employment	- Urban planning and design codes require a balanced ratio of jobs to housing.
5. Demand management	- Urban planning, building codes, and local government policies limit car parking and price parking appropriately for context.
6. Design	- Urban design codes create pedestrian- and cyclist-friendly neighborhoods, requiring highly connected street networks, pedestrian and cycling infrastructure, and public open space; lot layouts maximize natural surveillance.
7. Density	- Urban design codes require minimum and maximum context-specific housing densities, including higher-density development around activity centers and transport hubs.
8. Distance to public transport	- Urban design codes require frequent public transport services to be within 400–800m of residential walkable catchments.
9. Transport infrastructure investment	- Percentage of total government transport expenditure in a given financial year spent on pedestrian infrastructure, cycling infrastructure, public transport, and road infrastructure.
Spatial Indicators	Description
10. Public transport access	- Percentage of population living within 400–800 m of high-frequency public transport.
11. Employment	- Percentage of population with employment within 30 min of their home by walking, cycling, or public transport.
12. Distribution of employment	- Urban planning and design codes require a balanced ratio of jobs to housing.
13. Transport infrastructure	- Ratio of roads (km) to footpaths (km) and designated cycle lanes (km).
14. Density	- Dwellings per area: within 1.2 km of activity centers and public transport hubs, and in urban fringe developments.
15. Distance to transit	- Percentage of population living within 400 m of a bus stop and 800 m of a rail stop.
16. Destinations	- Percentage of (urban) land area allocated to essential daily living destinations.
17. Open or green space	- Percentage of (urban) land area allocated to open or green space.

strategies that promote an increase in active commuting among the population. Therefore, the concept of a compact city was introduced to address issues within its boundaries, preventing uncontrolled expansion and generating significant advantages for urban mobility. In order to improve cities, several actions are imperative, including: 1) promoting diversity in land uses to ensure that the basic needs of the population are within walking distance of their homes; 2) increasing residential and job densities; and 3) improving street connectivity by implementing cycle paths, which encourage people to walk or cycle. On the other hand, it is essential to plan and manage actions and resources to achieve this level of urban organization.

Moreover, the mere existence of regulations alone is not sufficient for implementing changes. It is necessary to stimulate the debate about urban planning in cities, as it is essential to monitor actions aimed at promoting urban mobility. Indicators such as access to

public transport and air pollution, for example, are still limited to capital cities that have higher financial and human resource contributions. Thus, as observed even in large cities, the evaluation and monitoring process of such indicators are rarely executed, and when conducted, there is a lack of standardization, hindering cross-city comparisons. This makes it challenging to effectively monitor these indicators within and across cities.

The standardization of these measures would help build a more organized and collaborative vision of urban planning by addressing three fundamental questions: 1) What resources are available? 2) What is being developed? And 3) What should be done? Such action is of utmost importance as it provides scientifically-based criteria for assessing and monitoring cities' progress towards a healthier and more sustainable future. It is necessary that all municipalities, regardless of size, know and use indicators to monitor urban planning policies and interventions with the aim of in-

creasing visibility and subsequent collection. This can be achieved through partnerships with universities and research centers, as well as by promoting the hiring of technical staff who have expertise in evaluating, implementing, and monitoring environmental interventions to promote active commuting.

In Brazil, substantial progress has been made in urban planning, particularly with regulations defining urban organization roles to meet the needs of the population concerning quality of life, social justice and development of economic activities. It is also reasonable to assume that physical activity should be one of the objectives of urban planning and management, particularly in the context of commuting. Thus, both the Statute of Cities as well as the National Urban Mobility Policy are important tools for the organization and growth of cities in ways that prioritize walking and cycling.

It is important to seize certain opportunities to prioritize the promotion of physical activity in urban planning, particularly in the context of commuting. Similar to the Unified Health System, the Master Plan of municipalities includes citizen participation from its development to implementation. However, its effectiveness relies on empowering citizens through these democratic processes, enabling them to demand improvements through consultations and public hearings regarding their municipality's master plan. Another critical aspect is the involvement of professionals who recognize the significance of the environment in promoting physical activity, especially during the development and revision of master plans and urban mobility. Lastly, it is important to highlight that city planning must align with the preferences and needs of its population. The public's demand for infrastructure that promotes and prioritizes transportation modes such as walking and cycling has the potential to influence the decision-making process in urban management and planning.

In this sense, forms of community organization and impact strategies can influence the planning and actions for the construction of infrastructure that enable the promotion of active transportation. Starting from simpler and more specific interventions, such as pedestrian signs and elevated crossings, to more complex ones like the creation of traffic calming, improvements in lighting, bicycle lanes, sidewalks, changes in land use zoning, and the transport system.

Final considerations

The advancements facilitated by public policies that

prioritize urban development have brought numerous benefits. The Master Plan must find solutions not only for cities that have experienced disorderly growth but also for those still in the process of expansion. It has become an important urban development strategy in municipalities without obligation, serving as a way to prevent problems and difficulties related to urban mobility that are common in medium and large cities.

In addition to addressing infrastructure issues, the urban planning process in Brazilian municipalities must be adapted and improved to meet current needs. In this context, it is suggested that those responsible for the development of public policies should prioritize the incorporation and standardization of evaluation systems for interventions aimed at improving urban mobility. These evaluation systems should be based on indicators.

Another essential consideration is that not all cities have systems in place to collect information on land use, urban mobility infrastructure, and access to sufficient resources for urban planning that are suitable for urban mobility. However, these municipalities can benefit from partnerships with universities and private institutions, as well as invest in technical capacity to conduct this monitoring.

Therefore, the role of urban managers in the planning process of their cities becomes essential for promoting urban mobility that prioritizes the active transportation of their population. For this reason, it is proposed to utilize appropriate indicators, targets, and monitoring methods tailored to the specificities and realities of each municipality. This will enable the assessment of the impacts of changes in the urban environment on the physical activity and active commuting of the population.

Conflict of interest

The authors declare that there is no conflict of interest.

Author Contributions

Silva AAP, Silva AT, Onita BM, Oliveira ES and Goulardins GS participated in the initial design of the study, as well as in writing and critically reviewing the manuscript at all stages. Wanderley Júnior RS and de Zorzi VN participated in the initial design of the study, the organization of the working groups, and the writing and critical review of the manuscript at all stages. Hino AAF participated in the design and planning of the project at all stages, coordinated the working groups, and critically revised the manuscript throughout the process.

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