DOI: 10.4025/jphyseduc.v36i1.3610

Original Article

ACTIVE SCHOOL COMMUTING: BARRIERS AND FACILITATORS IDENTIFIED IN THE SPEECHES OF CHILDREN IN A PUBLIC SCHOOL SYSTEM

DESLOCAMENTO ATIVO PARA A ESCOLA: BARREIRAS E FACILITADORES IDENTIFICADOS NOS DISCURSOS DE CRIANÇAS DE UMA REDE PÚBLICA DE ENSINO

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RESUMO

Objetivo: Identificar barreiras e facilitadores para o deslocamento ativo para a escola, com base nos discursos de crianças da rede pública de ensino de uma capital no sul do Brasil. Métodos: Estudo descritivo e qualitativo realizado em Florianópolis, SC, entre maio e junho de 2023. Foram aplicados questionários sociodemográficos e grupos focais para explorar os relatos sobre o trajeto casa-escola. A análise dos dados foi feita por estatística descritiva e análise de discurso. Resultados: Participaram 24 escolares (58,3% meninas), com idades entre 9 e 12 anos, cursando o quinto ano do ensino fundamental. Quatro categorias de barreiras emergiram dos discursos: falta de infraestrutura para caminhar e andar de bicicleta, ausência de transporte público, fragilidade estética do bairro e falta de segurança. Entre os facilitadores, destacaram-se: interação social, benefícios para a saúde e presença de equipamentos sociais. Conclusão: Barreiras e facilitadores no trajeto casa-escola impactam o deslocamento ativo dos escolares da rede pública de Florianópolis. Melhorias no ambiente do bairro podem promover maior deslocamento ativo.

Palavras-chave: Deslocamento ativo. Escolares. Educação Física escolar.

ABSTRACT

Objective: To identify barriers and facilitators for active school commuting, based on the discourses of children enrolled in the public education system of a southern Brazilian capital. Methods: This is a descriptive, qualitative study conducted in Florianópolis, SC, between May and June 2023. Sociodemographic questionnaires and focus groups were used to explore the children's accounts of their home-to-school commute. Data analysis was performed using descriptive statistics and discourse analysis. Results: The study included 24 students (58.3% girls) aged 9 to 12, all in the fifth grade of elementary school. Four categories of barriers emerged from the children's discourses: lack of infrastructure for walking and cycling, absence of public transportation, poor neighborhood aesthetics, and lack of safety. Among the facilitators, social interaction, health benefits, and presence of social amenities stood out. Conclusion: Barriers and facilitators on the home-to-school route directly impact the active commuting of students in Florianópolis's public education system. Improvements to neighborhood environments may be promising strategies for increasing active commuting among schoolchildren.

Keywords: Active commuting. Schoolchildren. School Physical Education.

Introduction

In the course of childhood, regular physical activity (PA) plays an important role in improving one's metabolic profile, bone mineral density, sleep quality, mental health, in addition to bringing about social benefits and expanding motor experiences[1,2,3]. Thus, studies show that the urban structure and the availability of safe and accessible spaces directly influence PA levels among children[4,5,6]. Therefore, it is imperative that public policies, programs, and actions are implemented with a focus on creating PA-conducive environments[7]. This includes the construction and maintenance of parks, bike lanes, safe sidewalks, and recreational areas, as well as traffic safety measures[8,9].Clique ou toque aqui para inserir o texto.Clique ou toque aqui para inserir o texto.

Such policies not only improve the physical and mental health of children, but also contribute to the development of healthy habits that last throughout life[10,11]. It is an important strategy for reducing physical inactivity, since the prevalence of the latter in schoolchildren is considered high, when compared to other age groups, and represents a potential public health challenge[12]. Thus, interventions aimed at active commuting have gained prominence for its low cost, for enabling a better perception of the characteristics of the neighborhood environment, and for promoting schoolchildren's health[6]. Commuting modes are an important domain that can support the benefits of PA for child development, especially due to the opportunity of going to school by walking or cycling[13]. Moreover, social interaction is expanded during the home-to-school route, making the trip more pleasant and motivating[14,15].

From this perspective, examples of urban mobility policies that encourage active commuting among schoolchildren are more prevalent in high-income countries in the contexts of North America and Europe[16]. Despite these findings, in the global southern scenario, initiatives are evidenced in Colombia and Brazil[17,18]. In the national context, the project *Carona a Pé* stands out, which is meant for empowering school communities to promote safe walks to the school, in order to improve safety and accessibility through active commuting[18]. More information about this initiative is available at: https://shre.ink/gzjW.

There are gaps in the literature regarding the understanding of barriers and facilitators that interfere with active commuting on the home-to-school route, which prevents the development of effective strategies to increase children's engagement with this practice. Furthermore, there is a lack of studies that investigate different commuting modes, such as by foot or bicycle, and their potential to raise the awareness of authorities from sectors such as health, education, and urban infrastructure.

The absence of an intersectoral approach that faces social iniquities and the fragmentation of social policies in low and medium-income countries are also evident[19]. Finally, there is a lack of evidence on the impact of results obtained from the perspective of children, which could influence strategies for promoting active commuting with a potential to reach a high number of people in the medium and long term.Clique ou toque aqui para inserir o texto.

Thus, the objective of this study was to identify barriers and facilitators related to active home-to-school commuting, based on the speeches of children enrolled in the public education system of a southern Brazilian capital.

Methods

Study Design

This is a descriptive study with a qualitative approach conducted in Florianópolis, SC, from May to July 2023. The municipality has a high human development index of 0.84714, and its estimated population of children and adolescents from 0 to 18 years old in 2020 stood at 128,750 (26.0%)[20]. The capital has five administrative districts, according to the Municipal Department of Education: North, South, East, Continent, and Center[21].

Study Participants

Sampling occurred in a non-probabilistic way, by convenience. To be part of the sample of this study, children enrolled in afternoon, fifth-grade classes at schools located in the Center and North administrative districts were included. A total of 24 students from three selected schools participated. In order to refine the methodological process of data collection, a pilot study was conducted at a randomly chosen school; it took place in June 2023 and included nine students – two females and seven males aged 9 to 12 years old. We applied a focus group at a school located in the East District, and all the students who participated resided in the

neighborhoods that compose the district. From the pilot study, we finished the necessary adaptations as to the formatting of the questionnaires and to the time of completion of the focus group.

Data Collection

Data collection was performed in two stages. In the first stage, a sociodemographic survey with 14 questions, prepared by the researchers, was applied. The sociodemographic block contained the following questions: Age; Sex. What is your color or race? Do you live with your mother? Do you live with your father? Including you, how many people live in your house or apartment? Do you have a cell phone? Do you have a computer or laptop at home? Do you have internet access at home? Does anyone who lives in your house has a car? Does anyone who lives in your house has a motorcycle? Is there piped water where you live? Paved streets? The second block of the questionnaire investigated the commuting modes for the home-to-school route: How many days did you go to school by foot or bicycle in the last seven days? When you go to school by foot or bicycle, how much time do you take? Over a week, what is your main mode for going to school?

In the second stage, an activity intended to bring the researchers and the kids closer was carried out, which consisted of a color game. The activity aimed to create an integrative and interactive environment among the students, facilitating communication, integration, and learning. A researcher conducted the game using a traffic light board. When the traffic light was red, the participants should be still; when the traffic light was green, they were recommended to move and play with their bodies.

For the third stage, the focus group[22] method was applied. There was one focus group per school, and the accounts were voice recorded. The participants were instructed to sit in a circle, and trigger questions were presented (What are the main facilitators for them to come to school by foot or bicycle? What are the main barriers to them coming to school by foot or bicycle?). It is worth noting that the discussions in the group were held on the basis of each question and, in the end, the participants were able to add their viewpoints.

Data Analysis

After data collection, the quantitative variables were tabulated and organized in a Microsoft Excel® spreadsheet. To characterize and present the study sample's sociodemographic information, descriptive statistics were performed through absolute frequencies and their percentages. For the analysis of the reports obtained in the focus groups, transcripts were made using Reshape software, which allowed for obtaining the speeches in full in Microsoft Word® documents for subsequent content analysis, as suggested by Bardin[23].

In the subsequent stage, the material was read, with possible errors being corrected and important points being highlighted. During material exploration, the unit of record was defined through the perception the students had of the barriers and facilitators for active commuting on their home-to-school routes. Regarding enumeration rules, direction-weighted frequencies (positive and/or negative impression concerning the unit of record) were considered, and the appearances had weight one each time they repeated in the accounts of different students, in accordance with the content analysis suggested by Bardin[23].

For analysis, a categorization was performed, following Bardin[23], in which the latency of the units of record was established for those with positive impressions in more than half of the interviews with the participants. Thus, the latent units of record were grouped into seven categories, in accordance with semantic (thematic) criteria, with the categories being called as: "1. Lack of infrastructure for walking and cycling"; "2. Absence of public transportation"; "3. Poor neighborhood aesthetics"; "4. Lack of safety"; "5. Social interaction"; "6. Health

benefits"; "7. Presence of social amenities". Finally, the data interpretation process was carried out through the units of record and their respective categories.

Ethical Matters

The present study was submitted to and approved by the Research Ethics Committee of the Federal University of Santa Catarina (CEP-UFSC) under CAAE 67766623.1.0000.0121 and Opinion No. 6.037.18. Participation in the research occurred voluntarily and only after signing of the Free and Informed Consent Form (FICF) by the parents, and the Free and Informed Assent Form (FIAF) by the children.

Results

A total of 24 students enrolled in three municipal schools of Florianópolis's education network participated in the study. In general, most participants were female (58.3%), were aged between 9 and 12 years old, had white skin color (54.2%), and lived with both their mothers and fathers (54.2%). As for internet use, all claimed to have access at home (Table 1).

Table 1. Sociodemographic characteristics of the students participating in the research. Florianópolis, Santa Catarina, Brazil, 2023. (n=24)1

Variables	Categories	n(%)
Sex	Female	14 (58.3)
	Male	10 (41.7)
Age (years)	9	2 (8.3)
	10	11 (45.8)
	11	8 (43.4)
	12	3 (12.5)
Skin color	White	13 (54.2)
	Black	3 (12.5)
	Brown	8 (33.3)
Legal guardian	Biparental	13 (54.2)
	Single-parent	9 (37.5)
Internet access	No	0 (0.0)
	Yes	24 (100)

Source: Authors.

As commuting modes, most have a motor vehicle at home (70.8%), but 54.2% of the participants commute by foot over the week (at least five times). The active commuting time (>10min) on their home-to-school route was limited to 47.1%, and only 45.8% of the students notice paving on the streets during this route (Table 2).

Table 2. Characteristics of commuting by the students participating in the research. Florianópolis, Santa Catarina, Brazil, 2023. (n=24)2

Participant	Motor vehicle at home	Weekly active commuting[b]	Active commuting time[c]	Presence of paved streets[d]
1		X		
2				
3	X	X	X	X
4	X	X		
5		X		X
6		X	X	X
7	X	X	X	
8	X	X	X	
9	X		X	
10	X	X	X	
11	X			X
12	X		X	X
13		X		X
14	X	X		X
15	X			
16		X		
17	X	X		
18		X	X	
19	X			
20	X			X
21	X			X
22	X			X
23	X			X
24	X			
Total	**17 (70.8%)**	**13 (54.2%)**	**8 (47.1%)**	**11 (45.8%)**

Note: [a]Motor vehicle at home: considered the presence of a car or motorcycle in the homes of the participating children; [b]Weekly active commuting: home-to-school commute by foot or bicycle up to five days; [c]Active commuting time: time of ≥10 min walking or cycling on the home-to-school route. [d]Presence of paved streets: streets on the home-to-school route with paving or asphalt.

Source: Authors.

Perception of barriers to active commuting on the home-to-school route

As for perceived barriers to active commuting on the home-to-school route, four thematic categories emerged: lack of infrastructure for walking and cycling, absence of public transportation, poor neighborhood aesthetics, and lack of safety.

Infrastructure for walking and cycling

The students pointed out the poor quality of sidewalks and bike lanes, as well as insufficient infrastructure on the roads, as barriers that compromise their active commuting from home to school.

> *"Well I don't know, teacher, let me think. I come by foot, but I find that bad, I like coming by foot, but what it's bad is that my sidewalk is so (makes a gesture to show the sidewalk is narrow). Got it? So bad that it's hard to walk."* (Student D; School A)

> *"Well, on her street, sidewalk, some parts have it, but there's not much sidewalk on her street."* (Student F; School B)

> *"I can't take the lamp post in the middle of the sidewalk anymore. I don't know why they... Why? There are so many places where they could put the post. But where do they put it? In the middle of the sidewalk."* (Student H; School C)

Public transportation

Lack of adequate public transportation on the home-to-school route was pointed out by the students as a significant barrier to their school commute. Additionally, the high number of users who take public transport at the time the students are going to school and going back home worsens the problem, which makes access to public transportation more difficult and less efficient for students.

> *"Yeah, we go standing on the bus, it's really cool to go up the hill standing, and there are also days that we can't catch the bus, because it's crowded."* (Student J; School C)

> *"We wanted them to, like... To change the bus a little, because, like... Sometimes, we have to wait 3, 4 buses to pass by us until we can catch one. Because there are a lot of children at the bus stop, got it?"* (Student K; School C)

Neighborhood aesthetics

The presence of garbage and sewage on the home-to-school route was another point highlighted in the focus groups. Besides, the students pointed out the lack of preservation of green areas.

> *"There's a lot of trash on the sidewalk."* (Student O; School C)

> *"Along the way I walk, there's a lot of trees. But you can see some trash on the floor, you know? " (Student R; School B)*

> *"Full of bush. Water running down."* (Student X; School C)

Safety

The negative perception of safety, referring to crime, was identified as a perceived barrier to active commuting among the students once.

> "*I have my bicycle; it wouldn't bother me that much to come walking. Like, the distance would bother me a little, the thugs a little too, right? Who walk on these street. So you gotta be careful*." (Student Z; School B)

When considering traffic safety, further points highlighted in the reports were speeding and absence of crosswalks in areas near schools.

> *"They don't stop. They don't stop to, like... Well, let the kids cross, right? No, they come at full speed."* (Student M; School C)

> *"We have to line up because the cars, they also go into the sidewalk, right there, like, to go down the hill here and go to the school. And they go onto the sidewalk, sometimes we have to stay very close to the wall, or they may run*

> *us over some day. And the street is really narrow for us to walk, you know? So we have to come inside from the street, so we walk along the wall side."* (Student V; School C)

> *"Fear of cars, because the other day there was a car crash, so, like..."* (Student F; School B)

Perception of facilitators for active commuting on the home-to-school route

Regarding the perception of facilitators for active commuting on the home-to-school route, three thematic categories emerged: social interaction, health benefits, and presence of social amenities.

Social interaction

Actively commuting to school in the company of mates was evidenced in the children's account as a strong facilitator.

> *"Some people there, let's suppose that I, Student V, Student J, and Student C are going home. And, like, going to school, in our normal routine. And we're walking and sometimes we like talking. I mean, like, as if we were like this, right now, together, on the street, and there's no way, right?"* (Student T; School C)

> *"I like taking with my friends while coming by foot."* (Student U; School A)

Health benefits of active commuting

Part of the students acknowledges that active commuting provides health benefits.

> *"Because it's better for us to walk and for us to make our way to school, to any kind of place, it's not just for coming to school."* (Student Y; School C)

> *"Because I think that coming by foot is a good thing for us to lose weight. It's a really good thing. And it makes our life so much healthier that we grow better. We don't stay in the car only, going around just by car. If we just use the car, we gain weight. And if we walk, we lose weight, and because cars also pollute nature."* (Student W; School A)

However, there was a different perception concerning health benefits on the part of some students from School B.

> *"Yeah, me too. It was kind of what I was going to say. That, if I did that, it'd be really good for my health, but here I'd get so tired that maybe it wouldn't be that good for my health. But it's good. "* (Student I; School B)

Presence of social amenities

The presence of social amenities, such as churches and schools, in the neighborhoods where the students reside favors active commuting on the home-to-school route, expanding the positive perception of the characteristics of the environment.

> *"Oh, I see a lot of things, you know? I see, I see churches, I see schools, I see squares, there is a house full of flowers, I see a lot of things. Yeah"* (Student Q; School A)

Discussion

This study aimed to identify barriers and facilitators related to active school commuting, based on the speeches of children enrolled in the public education system of a southern Brazilian capital. As for barriers, four thematic categories related to lack of infrastructure for walking and cycling, absence of public transportation, poor neighborhood aesthetics, and lack of safety emerged. On the other hand, identified facilitators were addressed in three thematic categories, namely: social interaction, health benefits, and presence of social amenities.

In this study, the inappropriate size, poor quality, and lack of maintenance of sidewalks (neighborhood aesthetics), as well as the evident perception related to the absence of bike lines (commuting), were barriers pointed out by the students. These findings are also evidenced in studies that have investigated active commuting on children's home-to-school route, in which lack of maintenance and accessibility of infrastructures for walking, as well as for riding a bicycle, were oftentimes identified as key factors that contributed to negative experiences and perceptions that make active commuting more difficult[24,25]. In general, it seems that the infrastructure-related negative perception makes the city hostile to students and limits commuting modes, including vulnerable populations such as the elderly, pregnant women, and people with disabilities[26]. Thus, this study brings as a suggestion the reformulation of urban mobility policies in the sense of prioritizing active commuting, such as walking and cycling. This involves the creation of urban spaces that encourage locomotion by foot and bicycle, making these options more attractive and safer.

Another barrier evidenced by the students was the absence of public transportation on their home-to-school route. The high number of public transport users during peak hours makes it difficult for students to access it while going to and leaving school[27]. City planning aimed at a better public transport integration is reported in several studies showing that road connectivity, as well as street density, diversity, layout and accessibility, are attributes of the built environment that impact people's choices in relation to their displacement patterns[13,26,28].

Possibly, a lack of public transport integrated to stations for active commuting among students has a direct impact on their access to school, and this can directly affect school attendance and academic performance[28,29]. This scenario reflects a social problem related to an insufficient supply of public transport, which is oftentimes not sized with a view to meeting the specific demand of school schedules. As a consequence, students can be conditioned to resorting to active commuting, such as walking or cycling, even if they are not always in ideal conditions to do so, either for reasons concerning safety, distance, or inadequate infrastructure[26]. The absence of accessible and efficient transportation alternatives reinforces the need for public policies that integrate education, health, and urban infrastructure, in order to ensure that all students have safe and adequate conditions for their home-to-school commute[28]. Thus, the need to integrate public transport with displacement by foot or bicycle is worth highlighting. This may involve the creation of specific public transport corridors, intermodal stations, and the coordination of schedules among different transportation modes.

Another barrier identified in the study was the presence of waste and sewage. The negative perception of neighborhood aesthetic characteristics corroborates the findings of other studies; when the urban landscape has a high level of green areas, as well as areas without garbage and open air sewage, motivational effects for active commuting are found among schoolchidren[30,31]. Moreover, the preservation of local infrastructure, such as clean streets, in combination with the presence of support resources, such as bicycle availability, were evidenced in studies conducted in Israel and Belgium[32,33]. Thus, it is assumed that the aesthetic quality and preservation of the urban environment play a determining role in influencing students as to them choosing active commuting modes for their home-to-school route[34,35]. Therefore, there is an emergent need for measures aimed at preserving the urban environment along home-to-school routes in order to create a pleasant environment. Additionally, expanding

selective waste collection and sewage treatment in the neighborhoods is suggested. The implications of these measures may contribute significantly to encouraging active commuting among schoolchildren.

The perception of safety, in relation to both traffic and crime, was identified as a barrier to active school commuting among the participants. Other studies have identified discomfort and insecurity in students when investigating whether a scenario of high-speed vehicles and reckless driving behaviors in the vicinity of schools causes uncertainties in active commuting[15,36]. With respect to crime, other studies also point out that students feel unsafe on their home-to-school route for fear of being robbed, assaulted, harassed, or kidnapped[30]. These findings reveal a need for implementing measures to reduce the incidence of theft, robbery, and crime in the neighborhood, as well as proposing interventions for more crosswalks, traffic lights programming, and calm streets, in addition to awareness campaigns for drivers.

With regard to facilitators, social interaction during active commuting was evidenced in this study. The opportunity to commute collectively to the school environment is positively seen in other findings[34,37]. Moreover, this displacement is perceived as an encouragement to experiencing positive emotional characteristics, such as dialog, sense of belonging to the space, and of being part of a group[38]. A possible explanation to these findings is that a more relaxed and interactive environment during active locomotion creates opportunities for socialization and active commuting, either by foot or bicycle[39]. On the other hand, when using passive transport modes (those that do not require physical effort for commuting, such as cars, buses, and trains), children tend to stay isolated in their seats and do not comprehend the characteristics of the environment[40]. Thus, the need to promote means for safe group walks on the home-to-school route increases.

The health benefits of active commuting on the home-to-school route were pointed out as facilitators. In this sense, commuting by foot or bicycle results in significant benefits for cardiovascular health and body mass index[3]. Broadly speaking, this practice not only promotes an active lifestyle, but also contributes to children's physical, mental, and social development.[41] Furthermore, active commuting also strengthens children's cognitive development, since decision-making during the home-to-school route stimulates the cerebral function and promotes cognitive skills such as attention, memory, and spatial reasoning[42]. Thus, encouraging and supporting active commuting in the daily routines of children means investing in all stages of their growth process and human development.

Another facilitator was the perception of social amenities during the home-to-school commute. In general, the influence of these social amenities on the health of schoolchildren has been investigated in other studies, which identified that the more evident they are in the neighborhood, the greater a child's feeling of safety and belonging in the neighborhood, and the scope of activities performed in community contexts are broadened[9,43]. Additionally, the study by Gadotti[44], when discussing the concept of educating city, highlights the need to consider the multiple experiences contained in the urban space as a cultural space for permanent learning. A possible explanation to this finding is that the presence of social amenities promotes an attractive and welcoming environment and can create points of interest on the daily route of schoolchildren, making it more pleasant and motivating [38]. Therefore, the findings of the present study emphasize the importance of urban planning actions that consider the implementation and maintenance of these social amenities that aim to ensure a greater active commuting for these schoolchildren on their home-to-school route.

Some limitations of this study must be taken into account. Monitoring comprehended only three schools of Florianópolis's municipal education network, which may not allow for extrapolating the collected data to other realities. Moreover, this research did not hold interviews with the schoolchildren's parents and/or legal guardians, which may have limited the number of barriers and facilitators found after the analysis of the reports. Thus, one

suggestion is the conduction of interviews that include the whole school community in order to broaden the understanding of active commuting modes on the home-to-school route.

As a strength of this study, the inclusion of the schoolchildren is considered to have proposed a diversified sample, which can establish greater sense and meaning in the results found about the researched theme. Another point worth highlighting is the choice of the focus group methodology as an effective approach for exploring the children's perceptions and experiences. The use of this methodology allows for broadening social interactions that may reveal deeper perceptions. The fact that the children were directly involved in the discussion about their own experiences underscores the participant-centered approach, promoting a more authentic comprehension. Besides, this study is pioneer in a city in southern Brazil with a high HDI, where active commuting by foot or bicycle may be restricted in a portion of the population.

Conclusions

This study presented barriers and facilitators for active commuting on the home-to-school route of children enrolled in the public education system of a southern Brazilian capital. The identification of these factors can guide education and health professionals and managers, as well as urban planners, in the sense of developing intervention strategies and actions aimed at strengthening the facilitators and, on the other hand, reducing existing barriers. Delving into the analyses, with greater participation of the school community, including parents, will allow for thoroughly identifying these barriers and facilitators, thus contributing to active commuting among schoolchildren in a safer and more sustainable manner.

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Acknowledgments: Santa Catarina College Scholarship Program UNIEDU/Graduate program(Public call No. 1423/SED/2019).This study was partly financed by the Coordination for the Improvement of Higher Education Personnel - Brazil (CAPES) - Finance code 001.

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Editor: Carlos Herold Junior.
Received on Aug 17, 2024.
Reviewed on Sept 24, 2024.
Accepted on Oct 01, 2024.

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