

# CHAPTER 10

## URBAN ACCESSIBILITY IN BELO HORIZONTE, BRAZIL: A CASE STUDY OF MOBILITY PRACTICES AND DEMANDS OF PEOPLE WITH DISABILITIES IN THE MOBILITY SYSTEMS

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### ABSTRACT

*Since the 1990s, several policy instruments have been produced in Belo Horizonte, Brazil, to improve accessibility to urban mobility systems, especially for people with disabilities. However, the city still faces important shortcomings in understanding the demands of the population with disabilities and in implementing an appropriate urban structure. The present work identifies mobility practices and demands for accessibility of this population based on a descriptive analysis of the city's origin/destination survey (2012) and results of a focus group with representatives of the population with disabilities and public authorities. The analysis demonstrates that the demands of persons with reduced mobility are characterised first by a high level of immobility, comparing to people without disabilities, which has important consequences on access to urban goods, especially jobs and health and educational services. Second, mobility has a relevant role in producing forms of discrimination and exclusion. Third, in addition to the problems*

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*faced by the general population, people with reduced mobility also face greater challenges in using transport systems. Ultimately, this analysis points out that the main needs for people with disabilities are related to the problems of articulation between public places and transportation systems, both in terms of infrastructure and in terms of attitude and behaviour of service providers and other citizens.*

**Keywords:** Accessibility; urban mobility; people with disabilities; urban policies; mobility practices; universal design

## 1. INTRODUCTION

Since the 1990s, managers of the city of Belo Horizonte, capital of Minas Gerais, Brazil, have produced various regulatory instruments and urban mobility projects, which have as one of their goals ensuring accessibility to urban transport systems for all citizens, particularly the ones with reduced mobility, such as elderly people and individuals with impairments and disabilities (physical, intellectual, hearing or visual). However, far from being an inclusive city, Belo Horizonte still faces shortages in normative arrangements, especially regarding the implementation of physical structures and public policy management to, as stated in the municipal law (De Oliveira, 2014), ‘provide wide and democratic access to the urban space, giving priority to public and non-motorized means of transportation’ (Belo Horizonte, 2011, art. 2).

The accessibility legal framework of Belo Horizonte is based on Brazil’s Federal legal framework, which consists of a set of federal law provisions and decrees, as well as accessibility standards as reported by the Brazilian National Standards Organization (ABNT, Associação Brasileira de Normas Técnicas in Portuguese). The development of the legal framework is distributed within various instruments, both territorial and legislative, regarding issues related to the population with disabilities. Thus, based on the Federal Constitution of 1988, in 1989, the Policy for the Integration of People with Disabilities was published, in 2000 – the laws promoting accessibility and priority of care, in 2001 – the City Statute, in 2003 – the Elderly Statute, in 2004 – the decree that regulates accessibility, in 2011 – the Access to Information Law and in 2012 – the National Urban Mobility Policy.

In 2015, a great consolidation and expansion of rights was the main goal of the Brazilian Law for Inclusion of People with Disabilities (LBI in Portuguese), designed to ensure and promote, on an equal basis, the exercise of fundamental rights and freedoms for persons with disabilities, aiming at their social inclusion and citizenship. Among other innovations, this law introduced universal design as a rule in the conception and implementation of transport projects. The legislation also includes the promulgation of the United Nations Convention on the Rights of Persons with Disabilities. The amendment to the Federal Constitution made in 2015 that now incorporates ‘the right to the transport’ as a new social right shall also be added to the accessibility legal framework, which allows us to conclude that, for the policies of inclusion of persons with reduced mobility, urban mobility is a main issue (Brasil, 2015).

In Belo Horizonte, the municipal legal framework distinguishes between sectoral and territorial instruments (De Oliveira & Souki, 2016). Local mobility and transport are regulated by the Municipal Master Plan, Law 7.165 (1996) and its new version, Law 1.749 (2019); the Urban Mobility Policy, Law 10.134 (2011) and the Mobility Master Plan, Decree 15.317 (2013). Two recent initiatives, both from 2018, illustrate the continued relevance of the theme of persons with reduced mobility in the formulation of urban policies in the capital of Minas Gerais. They consist in two normative instruments, those being the formulation of the *BHTrans Plan of Accessibility for Urban Mobility in Belo Horizonte in 2018* (De Oliveira, 2018b) and the establishment of the *Permanent Accessibility Commission of Belo Horizonte* (Belo Horizonte, 2018), which seek to ensure, at least formally, the right of broad and democratic access to urban space for all people.

The local accessibility legal framework is a step forward towards improving access to public transportation and to the city in general. However, a few studies carried out in Belo Horizonte have shown that the issue of access has been treated with a special emphasis on technical and infrastructural aspects, without the participation of citizens. Thus, the framework does not sufficiently incorporate the demands of those with reduced mobility, does not recognise the diversity regarding disabilities (Ardila Pinto & Villamizar-Duarte, 2018; De Oliveira, 2018a) and does not ensure enough control over the compliance of the actions of the local government, oriented to incorporate the universal design in the city transport (De Oliveira, 2019).

An analysis of the available information highlights the shortage of data that identifies access barriers faced by the city's disabled population. Moreover, the data indicate that there are a significant amount of people with disabilities or reduced mobility. According to the 2012 origin/destination survey (OD, Pesquisa de Origem/Destino in Portuguese), carried out by Minas Gerais's State Government, 3.9% of the population of the Belo Horizonte municipality claimed to have some kind of disability, and 73% of this group did not report any travels outside their homes. Furthermore, the city's infrastructure proves to be quite lacking. According to the 2010 census (IBGE, 2010 – Brazilian Institute of Geography and Statistics), compared to other Brazilian cities, Belo Horizonte shows good overall infrastructure indicators, as 98% of its households can be accessed by paved roads and 94% have sidewalks. However, a detailed analysis shows that only 9.6% of the sidewalks in Belo Horizonte are equipped with pedestrian corner ramps. In contrast, the same 2010 census shows that in Brasília and Porto Alegre, 16.5% and 23.3% of the sidewalks, respectively, are equipped with pedestrian corner ramps (these are the highest indicators in Brazil).

These data illustrate the gap between the objectives and the implementation of the policy addressing the transformation of urban space to meet the needs of people with disabilities. It is clear that we do not have enough information about the mobility demands of this social group. The aim of the present study is to identify daily mobility practices and demands of individuals with reduced mobility. To accomplish this, we have employed quantitative and qualitative methods of research that allow tackling the practices, as well as the demands of the disabled population based on their own experiences. For this purpose, we have carried out a descriptive analysis

of the mobility practices of people with disabilities (permanent and temporal) using data from the 2012 OD survey in the Belo Horizonte Metropolitan Region. To complement this analysis, we also carried out a focus group session with representatives of the city's organisations of people with disabilities and local and state government employees. Participants in the focus group were invited directly by the city government during the 2017 International Urban Accessibility Seminar organised by BH-TRANS and the World Resources Institute with support from the Minas Gerais Development Bank and the Centre of Urban Studies at UFMG.

Through these analyses, we found that the demands of people with reduced mobility are characterised, first, by the high level of immobility in comparison to people without disabilities, which critically impacts their access to urban goods, especially jobs and health and educational services. Second, mobility has a relevant role in producing forms of discrimination and exclusion. Third, in addition to the problems faced by the general population, people with reduced mobility also face greater challenges in using transport systems. Ultimately, this analysis points out that the main demands of people with disabilities are related to the problem of articulation between public places and transportation systems, both in terms of infrastructure and in terms of attitude and behaviour of service providers and other citizens. Identifying the disabled population's demands can contribute to the knowledge and progressive incorporation of the variables related to accessibility in public policies, in order to overcome the purely technical and sectoral nature of the urban policies. The variety of demands from these groups challenges experts and citizens to create more inclusive cities, with policies that allow us to move towards the full exercise of the citizenship rights and the guarantee of justice and equity.

In order to understand the practices and demands of the disabled population, we have divided the chapter into four sections. The second section contains a literature review on the relationship between disabilities and mobility. The third section presents the conceptual framework and the adopted research methods. The fourth section displays the results of the study, which are subdivided into two sections: first, the travelling practices and experiences in the city based on the 2012 OD survey data, and second, the mobility experiences and demands reported by the focus group. The latter specifically discusses accessibility for people with disabilities. The fourth and last section of the chapter presents the final considerations of our study.

## **2. LITERATURE REVIEW**

Research on the relationship between disability and urban mobility is part of a gradual process consisting of the progressive incorporation of the social dimensions to the study of the movement of people, ideas and goods in cities. This has been visible mainly in research addressing accessibility of transport infrastructures from either physical and functional or economic and social perspectives. New approaches have been developing in the search to understand disability not as a limitation, but as an opportunity for all urban agents to incorporate the citizens' diversity and to promote democratic inclusion.

Since the 1950s, transport engineering and regional planning perspectives based on a functional and economic approach to movement have been dominating the transport studies. Factors such as distance, population size, urban functions, the structure of the goods and services market and the organisation of governments were considered significant and were incorporated into mechanics-inspired gravitational models for the analysis of physical places. The agents were understood as abstract and homogeneous individuals that make rational decisions and no clear distinction was made regarding their physical, social or cultural characteristics (Chorley & Haggett, 2013 [1967]). Thus, such understanding resulted in/ led to the overlooking of ended up and demands of specific population groups.

Following the 1970s, a significant group of authors questioned the functional and economic approach in the field of transport research and started taking into account the diversity regarding individuals' situations and demands. Kain (1968), Wachs and Kumagai (1973), and Segui Pons and Petrus Bey (1991), among others, incorporated a perspective and characteristics of varied individuals into the mobility studies. Oviedo and Titheridge (2016) demonstrated that elderly people, people with disabilities, children, black people, women and poor people present the highest inequality levels in the city. In the same way, Schönfelder and Axhausen (2010), Gannon and Liu (1997), and Brand et al. (2012) illustrated the connection between these sociodemographic aspects and the travelling experiences, rhythms and representations of the urban agents

Other significant contributions were made by authors that emphasised the role of the individuals' demands in relation to the city's and the transport system's characteristics. Van Wee and Geurs (2004, 2011) suggest that the dimensions of land-use and distribution of activities, the components of transport, must be analysed based on the experiences of the individuals. They may be approached in terms of the relation between origin and destination, the time constraints and the availability of infrastructure in different spaces and times. Daniel Banister (2018, p. 44) debated on the mediating role of public transport policies in terms of conciliating the availability of opportunities and individual aspects, and social justice and social mobility. The author considers the public investment in transportation to be relevant, directly or indirectly, through allowances, to reduce social inequality. In the same way, Cervero (2011, p. 19) highlighted the relationship between transport planning and the public investment in mass transport. The investment of the public sector in transport is considered to be a moral issue, since mobility is not only a public good, but a human need. Public transport services provide connection, particularly for poor people and other vulnerable groups, most of them ignored by the market (Cervero, 2011, p. 5). These studies show that accessibility to transport contributes to reducing inequality and must be understood in terms of the individuals' opportunities and capabilities to enjoy urban, spatial and social benefits.

Specifically related to research on persons with disabilities within the transport field, we found studies that seek to identify the influence of disabilities on the accessibility of urban goods and services. One of the most renowned studies is Litman's (2017) that proposes the concept of vertical accessibility to understand how individual characteristics (skills and needs of individuals and groups) of elderly people and

people with disabilities prevent them from using and accessing the city effectively. This concept is opposed to that of horizontal accessibility, which implies equal treatment for equals in socioeconomic aspects. The author further proposes strategies for increasing equity, including universal design, spatial mobility services, special parking for persons with disabilities and quality services for non-drivers. Likewise, [Wasfi, Levinson, and El-Geneidy \(2012\)](#) analysed the situation with elderly people and people with disabilities, demonstrating the difficulties that these groups face to access medical services, to work, to do shopping, etc., as well as the need for better public transport services and physical access to public and private spaces.

From a *mobility ontology* perspective, [Gharebaghi et al. \(2018\)](#); [Rosenberg, Huang, Simonovich, and Belza \(2013\)](#); and [Fougeyrollas \(2010\)](#), among others, proposed to integrate the spatial and social dimensions with the experiences and semantic networks of the groups of people with disabilities at three different scales of analysis: micro (an individual), meso (community/services) and macro (society/system). Through this analysis, the authors demonstrated how each mobility system enables the development of the capacities of people with disabilities. They created analytical models to identify how daily activities, places and characteristics of individuals in different disability situations are linked.

Another relevant approach to mobility practices is the environmental perspective. For the authors who support this approach, the physical environment and space are the ones that hamper the capacity of persons with disabilities to perform daily life activities, to have choices, freedom and to take part in the collective life. To geographers like [Gleeson \(1999\)](#) and [Chouinard, Hall, and Wilton \(2010\)](#), spatial, social and economic barriers are related to the segregation and marginalisation created by capitalism and to the ways in which the body and normality concepts are built, both spatially and socially. More specifically, the studies are trying to understand how different impairments and disabilities are associated with not only environmental, but also to other variables, such as '*physical-built environment, societal attitudes, and system/policy environment*', as stated by [Altman, Lollar, and Rasch \(2014, p. 36\)](#).

The role of urban environments and services is thus defined as that of to provide connectivity, ways and spaces to promote a healthier lifestyle, higher sociability and independence both for persons with disabilities and elderly people ([Wahl, Iwarsson, & Oswald, 2012](#); [Webber, Porter, & Menec, 2010](#); [Yen, Michael, & Perdeu, 2009](#)). The effects of the quality of healthcare and education services on the activity level of persons with disabilities and elderly people with reduced mobility are also being considered. By analysing the barriers of the built environment, this body of literature helps to identify which urban conditions of different physical environments contribute to the walkability capacity for these groups of people ([Gell, Rosenberg, Carlson, Kerr, & Belza, 2015](#); [Rosenberg et al., 2013](#)).

This group of authors seeks to identify in more detail the factors that affect the mobility of these groups in public spaces by assessing the number of parking lots and car services, the quality of the curb ramps, lighting, crossings, signals, paved surfaces, sidewalks and other elements of infrastructure for the pedestrians, as well as their usability, especially for the people with motor and visual impairments. For them, the implementation of the universal design and the assistive

technology are essential strategies for adapting the urban environment to the individual needs of different types of disabilities and evaluate the role of the assistive in the improvement of mobility (Gharebaghi et al., 2018; Kirchner, Gerber, & Smith, 2008; Rosenberg et al., 2013).

Based on a social perspective, some authors examined disability as a constraining factor in the use of the urban space and means of transportation, considering the built environment as the main element that hinders or favours the access to the city and its services. Particularly, some studies of accessibility in urban environments have demonstrated the relation between physical and attitudinal barriers and transport policies, urban land-use and city planning. For example, Bezyak, Sabella, and Gattis (2017) provide a description of the persistence of physical and attitudinal barriers in the transport system in the USA after the implementation of the Americans with Disabilities Act (ADA) in 1990. Moreover, Velho, Holloway, Symonds, and Balmer (2016) analyse the barriers faced by wheelchair users in public transport in London. Despite the improvement on the accessibility of London buses and the promulgation of The Disability Discrimination Act in 1995, the authors identify negative user experiences associated with technological, spatial and social barriers. Wheelchair users are not being seen as potential clients and face isolation and anxiety in a city with a crowded and rigid transport system. Hine and Mitchell (2001) also explore the travel experiences and elucidate how transport policies are being shaped by a notion of an universal disembodied subject, without taking into account the differences and disadvantages. In particular, the authors argue that a social agenda for transport has to put accessibility in the centre of the policy in order to create equality of access as a civil right.

More recently, authors from the *mobility turn* perspective have analysed the mobility practices of this population group (Parent, 2016). Goggin (2016) exposes how mobility practices link different citizenship forms at different scales. Sawchuk (2017) also analyses how the social construction of *impairments* can create *disabilities* in an ontogenetic process that changes with time. Different identity forms can conflict in their demands of resources and rights in the mobility space, thus generating unequal capacities, like, for example, pedestrians and wheelchair users or children, elderly and wheelchair users in transport systems. The studies based on this perspective contribute to the perception of disability as a more relatable, changeable and diverse form of identity, allowing the understanding of the demands of the groups with disabilities in terms of their rights and power struggles in society.

Together, all these authors acknowledge the importance of the social, spatial and political dimensions of movement in understanding the inequality in transport systems. The advances of these works allowed the recognition of the effects of disability on the economic, political and social participation of individuals in urban life. They also contributed to the understanding of the roles that urban structure and organisation of transport systems play in the accessibility for groups that, due to their individual characteristics, have specific needs. Nevertheless, the analysis is still bound to the idea of disability as an inherent condition of an individual, as a fixed identity, and in some cases, as a homogeneous situation of disability. On the other hand, especially in accessibility studies, more structural dimensions or more

technical evaluations of the quality of the urban space are valued, assigning less importance to the individuals with disabilities' own perceptions. Recognising the diversity of situations, experiences and practices regarding the use of the urban space of this group represents a theoretical and methodological challenge that must be faced to move forward in the comprehension of this issue.

### 3. FRAMEWORKS AND METHODS

In this section, we present the main concepts that were used in this study to define the conceptual framework that facilitated the identification of methods used to pinpoint the demands of people with disabilities. Subsequently, we explain the techniques, instruments and sources used in the analysis of both practices and demands.

#### *3.1. Conceptual Framework*

For this study, we have adopted a concept of disability that recognises the ontological dimension of the agents, in terms of their capacities, practices and experiences, as well as in the way their bodies interconnect with the urban environment (Altman, Lollar, & Rasch, 2014). Our aim is to overcome the idea of abnormality, which treats people with disabilities as a segregated, special, fixed and homogeneous group (Da Silva Bampi, Guilhem, & Alves, 2010; Gharebaghi et al., 2018). We consider disability to be a result of the interdependency between biological, psychological and cultural aspects (Imrie & Kumar, 1998). It is an embodied experience, which implies the construction of social identities (Chouinard et al., 2010) that are diverse and result in different practices, experiences and meanings, which may be transient or permanent, physical or intellectual and may change over time (Sawchuk, 2017; Shakespeare, 2001). Thus, we analysed many forms of mobility, in terms of temporary and permanent disabilities, and different displacement scenarios, like public transport and public spaces.

People with disabilities face daily restrictions in travelling and develop movement practices and strategies that shed light on other forms of social differentiation and diversity (Boys, 2014; Imrie & Street, 2011). The creativity that persons with disabilities employ in order to use the space can help understand the differences in their bodies and socio-spatial practices. People with disabilities can be perceived not as unequal and vulnerable users with needs, but as agents that contribute to the construction of the strategies of relativisation and recognition of human diversities and different forms of urban use and to promote the production of richer and more creative spaces (Boys, 2014). Based on that perspective, we have carried out focus groups that allow us to identify the barriers to accessing city transport and goods and to ensure mobility in urban spaces. This analysis enables proposals for strategies to overcome the challenges imposed by the urban barriers in the future.

The demands of people with disabilities can be understood as more than just special needs, but also as the exercise of citizen's rights (Levy, 2009; Sheller, 2008), in which other forms of equity, power and justice are evident. Looking at these demands allows us to identify forms of social inequality, engendered by

circulation barriers, and also to the wishes and the difficulties in carrying out the citizens' projects (Urry, 2007). They also provide us with an opportunity to identify the extent of the awareness about human diversity in urban policies, from the perspective of space construction and social practices of use of the urban space, and to understand the combination of different forms of inequality, since from an intersectional perspective, disability is interlaced with other forms of exclusion like gender, race, class or ethnicity (Hamraie, 2017).

Based on this framework, we have analysed the ways transport systems are used by people with disabilities, the barriers they face daily, as well as the demands regarding the urban space and the city residents. We have identified these practices in terms of their relation to the variables of sex and age (available in the references), level of education and integration with the job market (understood as indirect income indicators). These variables are relevant for grasping the diversity in disability cases and moving forward towards an intersectional perspective on the issue. The next section explains the methodological proposition created for the understanding of the object in question.

### 3.2. Data Collection and Systematisation

To examine the daily mobility practices and demands of the individuals with disabilities, this study used quantitative data from the 2012 OD survey and qualitative data from focus groups. We have analysed the sociodemographic profiles and travel profiles from the 2012 OD survey in Belo Horizonte's Metropolitan Region carried out by the Belo Horizonte Metropolitan Region Development Agency and the State Department of Metropolitan Management (SEGEM) of Minas Gerais. The universe of the survey consists of 34 municipalities of the Belo Horizonte Metropolitan Region (BHMR) (Minas Gerais, 2013, p. 72). 43,784 households were visited, giving a final sample of 30,786 households. The trust level of the statistical analysis in our work was set to 95%, the margin of error to 1% and the estimated variance to 1%. The spatial cutout was the city of Belo Horizonte and the data came from the Household Survey module, which collected data about the trips performed on the day before the day of the survey by all the dwellers of the selected residence. We conducted a descriptive statistical analysis based on Pearson's chi-squared test and the significance level of 0.05 was used to analyse various characteristics of the group.

In order to identify the problems that persons with disabilities face in BHMR and to create more democratic environments for the construction of public policies, we organised a focus group with the participation of leaders and representatives from the organisations of people with disabilities and from the state agencies of Belo Horizonte and BHMR. Through this focus group, we first sought out to identify people's own visions about their accessibility and daily life in the city and second, hear about the challenges that they face in order to travel around and take part in the public life of the city. Individual observations and collective discussions revolved around one main question: *which problems hinder full and democratic access to the urban space in the Belo Horizonte Metropolitan Region?* By the end of the session, the group drew up a document entitled 'Letter of

Belo Horizonte for the right to a city for all' ('Carta de Belo Horizonte pelo direito a uma cidade para todas e todos' in Portuguese), which was sent to the Belo Horizonte Mayor's Office and to the Minas Gerais State Government. The responses collected in the focus group were analysed using IBM SPSS Statistics (IBM, USA) software.

The focus group was held on the 24 August 2017 and had 50 participants. Among them, the participants of the organisations of people with disabilities that represented the following organisations: Coletivo BH Acessível (The Collective Accessible BH), Associação dos Usuários de Transporte Coletivo da Grande Belo Horizonte (Users of Public Transport of Greater Belo Horizonte Association), BH em Ciclo (BH in Cycle), Movimento Nossa BH (Our BH Movement), City Councils for the Rights of Persons with Disabilities and the Rights of Elderly (both of the city of Belo Horizonte), among others. The representatives of public authorities were the administrators of Empresa de Transportes e Trânsito de Belo Horizonte (BHTrans; Transport and Transit Company of Belo Horizonte), BHMR Development Agency, Department of Buildings and Roads of Minas Gerais (DEER/MG, Departamento de Edificações e Estradas de Rodagem de Minas Gerais in Portuguese), Municipal Authority of Transit and Transport of Contagem (TransCon), Superintendence of Urban Trains of Belo Horizonte (STU-BH), Municipal Department for Urban Planning of Belo Horizonte (Smapu, Secretaria Municipal de Planejamento Urbano in Portuguese), among others.

The participants set out 176 demands that were codified in order to classify and organise the diversity of statements. The coding process was carried out using a two-stage category reduction process (Miles & Huberman, 1984). In the first stage, 33 code clusters were identified, which attempted to preserve, in a more detailed manner, the participants' contribution. In the second stage, eight larger groups were created, based on dimensions related to the urban mobility and transport policy. This space for dialogue was of fundamental importance for perceiving both the necessity to include citizens' views in the local policy-making and the differences that exist within the population with disabilities.

#### 4. RESULTS

As previously discussed, the efforts in the creation of regulatory instruments are important steps to improve access, to ensure the rights of people with disabilities and to adopt universal design as a criterion for urban design. Nevertheless, the analysis of citizens' practices and their experiences shows that the full exercise of freedom and the overcoming of barriers still require an incorporation of accessibility principles in the instruments of urban planning and transportation, in the management of mobility systems and in the daily practice of citizens. While the principles of the universal design are still far from being fully applied, the production and use of urban space still have a remarkably exclusionary character (Ardila Pinto & Villamizar-Duarte, 2018; Hamraie, 2017; Hine & Mitchell, 2001; Shakespeare & Watson, 2001).

The analysis of the practices and experiences in the present study shows that the enforcement of the rights of persons with disabilities in the scope of urban mobility is still insufficient. In order to grasp these aspects, we have analysed the practices of the population with disabilities based on the 2012 OD survey, and to understand the experiences and mobility demands, we have used the focus group study as a basis. Both methodologies, complementing each other, allowed identifying the different situations faced when using public mobility spaces for travelling in the city.

#### *4.1. Daily Travelling Practices of People with Disabilities*

The sources available for broad measurement of the movement practices of this population are quite limited. In our work, we have analysed the 2012 OD survey data. This survey measures the travelling patterns according to the different characteristics of each disability (Minas Gerais, 2013, p. 35). Regarding people with disabilities, first, we identified the sociodemographic characteristics of groups considered disabled. Then, we established the travelling patterns according to the motive, mode of transport and duration. These data allowed us to recognise the similarities and differences between distinct mobility situations according to the types of disability.

It is necessary to point out that the type of disability in the OD survey was assigned based on a self-declaration of the interviewed person. This self-declaration contains information if an individual 'has' any disability, if the disability is 'temporary' or 'permanent' and what is their type of disability (options are: motor, hearing, mental, visual or slow gait). The institutional classification of disability is limited to a given extent, not allowing further understanding of the diversity of this population, nor does it inform about other forms as exclusion such as race, gender or ethnicity. Yet, this is the most complete research available about mobility practices in the city. In order to compare the practices of the population with disabilities to the ones of the population that declared to have none, and to measure the relationship with other variables, we used the chi-square test. This analysis enables us to identify some characteristics of the practices of disabled group with more reliability.

The results demonstrate that there are 1.805 individuals (3.9% of Belo Horizonte population) that declared themselves as disabled and live in the city of Belo Horizonte. We have found that gender is distributed as follows: 44.8% are men, 55.2% are women; this distribution is quite similar to the distribution of the population 'without disabilities'. Yet, when it comes to age, there is a significant difference ( $P$ -value = 0.000 ( $p < 0.05$ )) between the groups: the most part of the persons with disabilities' population is in the group aged between 50 and 59 years (16.9%), a result similar to the results of other studies; this is related to the increase in the disability rate in the process of ageing (Sze & Christensen, 2017). However, we found that there is also a significant portion of people with disabilities considered young, in the age group of 20–29 years old (16.8%), belonging to the economically active population (Fig. 10.1).

The survey data for the city of Belo Horizonte show that among people in economically active ages (between 15 and 65 years according to the IBGE), only

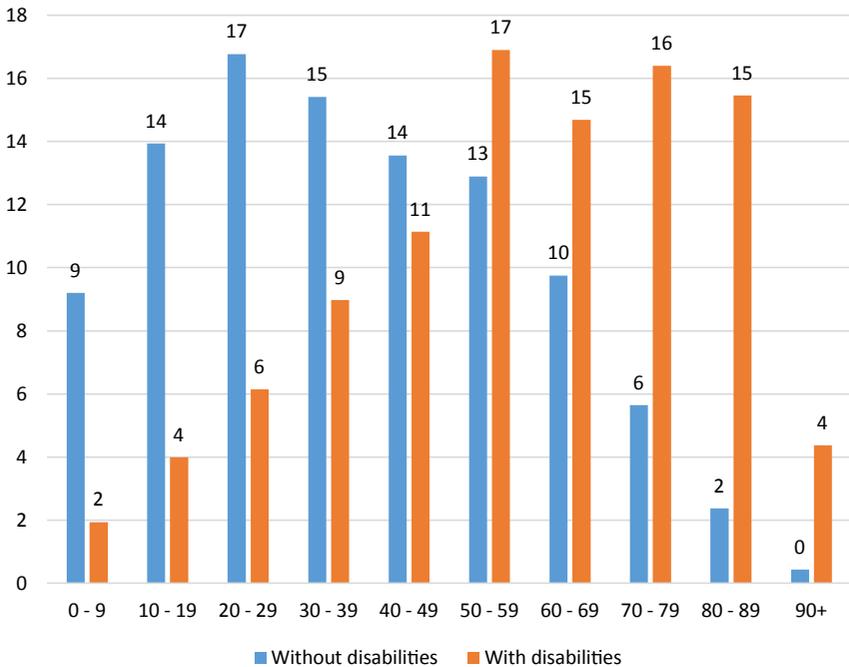
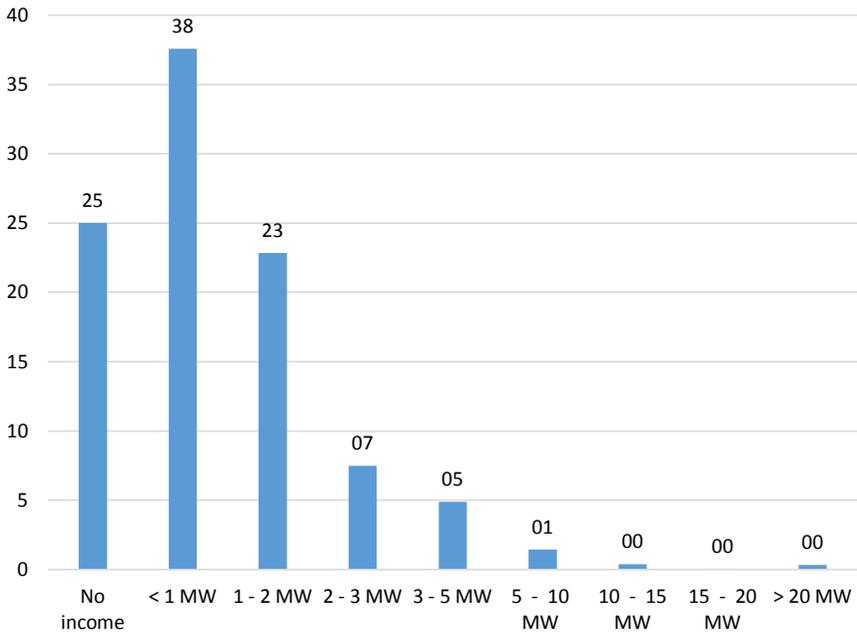


Fig. 10.1. Percentage Distribution of Persons With and Without Disabilities by Age in the City of Belo Horizonte. *Source:* Authors' calculations based on the OD survey data, taken in Belo Horizonte in 2012 (Minas Gerais, 2013).

12.5% of people with disabilities have reported employment, whereas among people who do not have disabilities this rate reached 59.6%. With respect to income, people with disabilities of Belo Horizonte show a very low level of earnings compared to the general population. These results indicate a low insertion of this population into the job market, which is associated not only with economic barriers but also with the lack of adequate access to urban mobility services (Clarke, Ailshire, Bader, Morenoff, & House, 2008; Rantakokko, Iwarsson, Portegijs, Viljanen, & Rantanen, 2015) (Fig. 10.2).

Inequalities in relation to employment may also be associated with levels of schooling in this group. The differences by level of education are evident: 37.9% of people with disabilities have incomplete primary education, and 13% are illiterate. For the group of people without disabilities, illiteracy is only at a 1.4% rate, with incomplete primary education corresponding to 27.2% of people from this group in the city of Belo Horizonte. On the other hand, only 6% of people with disabilities have completed higher education, the people without disabilities rate reaches 12.3% ( $P$ -value= 0.000 ( $p < 0.05$ )).

Low levels of education and low labour market insertions, as well as advanced age, seem to be significantly related to the structure of the trips of this population. To identify this pattern, we employed the average number of trips per individual



*Fig. 10.2.* Percentage Distribution of Per Capita Income in Minimum Wages of People with Disabilities. *Source:* Authors’ calculations based on the OD survey data, taken in Belo Horizonte in 2012 (Minas Gerais, 2013).

per day. To obtain this value, the number of trips made was divided by the number of people who made those trips. For the total number of persons in the city of Belo Horizonte, the daily number of trips per person was 1.43 trips/person. In the case of people with disabilities, each individual with disabilities performed 0.62 trips per day. Another important difference can be observed when this value is compared between self-reported cases of permanent and temporary disability: the obtained values are 0.74 trips/person in case of temporary disability against 0.59 trips/person in case of permanent disability. These findings indicate that the mobility of persons with permanent disabilities is even more restricted.

Significant differences are observed when comparing diverse disability situations. The individuals that declared temporary disabilities travel more than those who declared permanent disabilities. The diversity is even more evident when we observe that while a person with temporary visual impairment makes 0.85 trips/day, a person with a permanent intellectual disability makes only 0.36 trips/day (Fig. 10.3).

Analysing the reasons for travel, besides returning home, it is important to note the significance of travels for health reasons for people with disabilities, especially in groups with motor disabilities, either temporary or permanent. It is also important to note that trips made by people with visual or hearing impairments were more diverse, with a predominance of travels to work or to go shopping (Table 10.1).

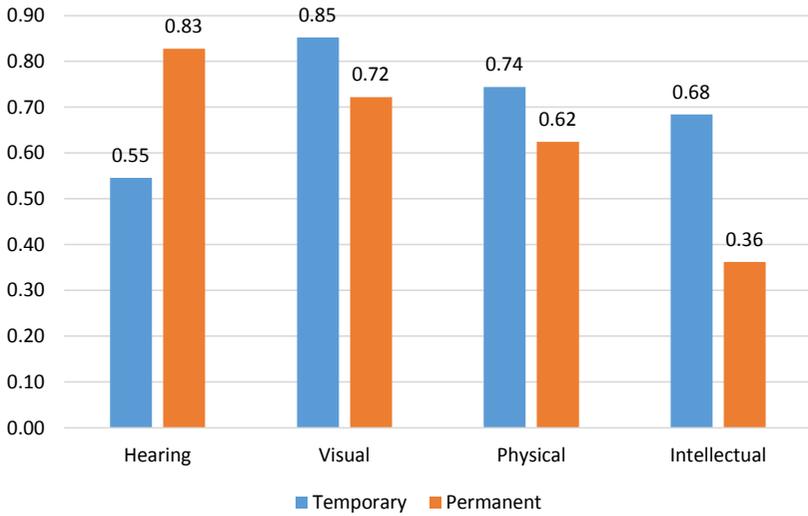


Fig. 10.3. Number of Trips per Day per Person in Belo Horizonte According to the Disability Type. Source: Authors’ calculations based on the OD survey data, taken in Belo Horizonte in 2012 (Minas Gerais, 2013).

Table 10.1. Percentage Distribution of Reasons for Travelling in Belo Horizonte According to the Disability Type.

Type	Disability	Purpose											P-value
		A	B	C	D	E	F	G	H	I	J	K	
Physical	Without	3	13.4	0.3	3.4	3.2	2.2	2.4	1.4	46.0	2.3	22.4	0.000
	With	7	2.3	0	5.5	6.3	5.5	3.1	0	45.3	15.6	9.4	
Hearing	Without	3	13.4	0.3	3.4	3.2	2.2	2.4	1.4	46.0	2.3	22.4	0.011
	With	33.3	0	0	0	0	16.7	0	0	50.0	0	0	
Visual	Without	3	13.4	0.3	3.4	3.2	2.2	2.4	1.4	46.0	2.3	22.4	0.04
	With	4.3	4.3	0	4.3	4.3	4.3	4.3	4.3	43.5	8.9	17.5	
Intellectual	Without	3	13.4	0.3	3.4	3.2	2.2	2.4	1.4	46.0	2.3	22.4	0.000
	With	3.8	7.7	0	3.8	11.5	0	3.8	0	42.3	23.1	4	
Physical	Without	3	13.4	0.2	3.4	3.2	2.2	2.4	1.4	46.0	2.3	22.5	0.000
	With	5.4	7.3	0.6	6.7	4	4.2	4.5	1.3	47.0	12	7	
Hearing	Without	3	13.7	0.3	3.4	3.2	2.2	2.4	1.4	45.8	2.3	22.3	0.000
	With	7.3	7.3	0	6.3	2.1	3.1	3.1	1	47.9	10.4	11.5	
Visual	Without	3	13.4	0.3	3.4	3.2	2.2	2.4	1.4	46.0	2.3	22.4	0.000
	With	13.9	4.9	0	7.4	3.3	7.4	1.6	0.8	46.0	5.7	9	
Intellectual	Without	3	13.4	0.3	3.4	3.2	2.2	2.4	1.4	46.0	2.3	22.4	0.000
	With	3.7	24.8	0	3.1	0	1.9	2.5	0.6	47.9	9.9	5.6	
Slow gait	Without	3	13.5	0.2	3.4	3.2	2.1	2.4	1.4	46.0	2.4	22.4	0.000
	With	9.3	3.4	0.6	10	0.6	6.3	4	0.6	47.2	13	5	

Source: Authors’ calculations based on the OD survey data in Belo Horizonte in 2012 (Minas Gerais, 2013). Legend: A – shopping; B – studies; C – transfer; D – leisure; E – giving a ride; F – personal business; G – other; H – meal; I – home; J – health; and K – work.

Statistically, significant differences were found regarding the use of public transport, where people with disabilities tended to use public transport to a greater extent than those who did not declare disabilities; the latter employed private transport more. This difference, though small in absolute numbers, expresses an important dependence on public systems and, therefore, the need to ensure their accessibility for the group of people with disabilities. Both groups used non-motorised transport at the same rate; therefore, improvement of sidewalks and cycle lanes is of great importance to all citizens (Fig. 10.4).

The demographic profile of people with disabilities and their travel patterns demonstrate important differences from the people who declared themselves non-disabled. For the group of people with disabilities, immobility is a structuring reality of their daily life, associated with their great socioeconomic vulnerability, lower labour market insertion and low level of education. However, the diversity of disability situations is also a significant factor, and greater participation and mobility are observed among those with temporary disabilities, compared to persons with permanent disabilities.

As we described in the literature review, other studies point out that disability is not an inherent condition of individuals, but a relationship with their bodies, their socioeconomic situation and the urban environment (Altman, Lollar, & Rasch, 2014; Van Wee & Geurs, 2011). Each disability situation, in dialogue with the city, can enable or impose barriers to the participation in the dynamics of the city for groups with different corporealities (Chouinard et al., 2010; Clarke et al., 2008; Imrie & Street, 2011; Rantakokko et al., 2015; Shakespeare, 2001). Results show that inequalities are greater for those who present more permanent situations, particularly associated with intellectual disabilities. The diversity of situations

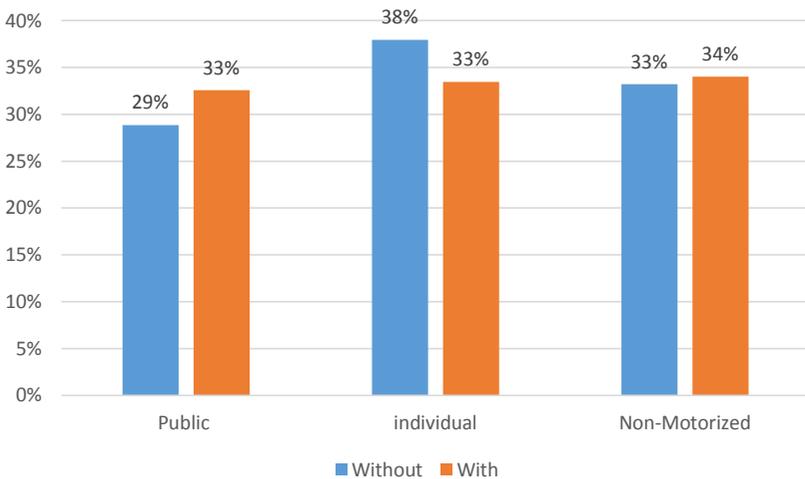


Fig. 10.4. Percentage Distribution of Modes of Transport of People with Disabilities in Belo Horizonte. Source: Authors' calculations based on the OD survey data, taken in Belo Horizonte in 2012 (Minas Gerais, 2013).

according to the different forms of disabilities is also relevant. The different corporealities display great variability in terms of immobility rates, labour market insertions and opportunities to access schooling. More generally speaking, the high rate of immobility and the heavy reliance on public transport for the people with disabilities of Belo Horizonte make up a challenge for public policies to ensure the right to mobility of these highly vulnerable groups.

#### *4.2. Mobility Experiences of People with Disabilities in Belo Horizonte*

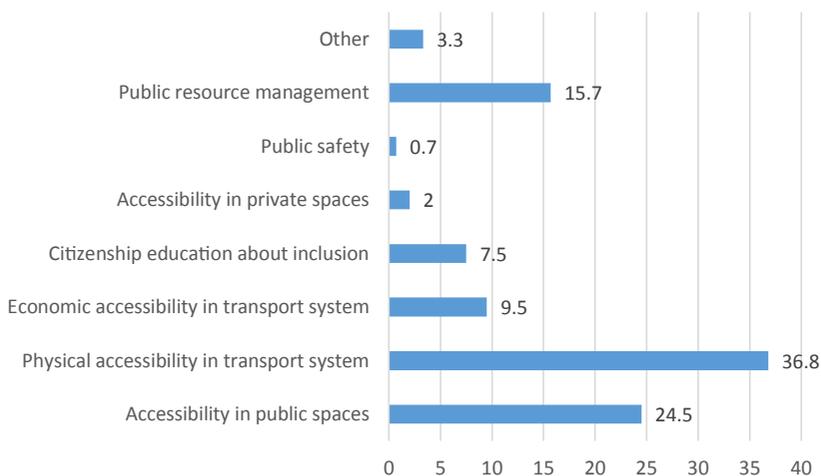
The analysis of travel patterns based on the OD survey data does not provide enough information about the diversity of practices and demands of people with disabilities. From the experiences reported by the agents in the focus group, a high number of diverse issues and problems that they face daily can be noted. As [Boys \(2014\)](#) and [Imrie and Street \(2011\)](#) point out, it is necessary to understand the relational and political character of the mobility of the social group of persons with disabilities.

The results of the participatory exercise of the focus group present a complex view of the problem, which contrasts with the generalising, technical and homogenising approach seen in the legal arrangements. Together, the participants set out 176 demands on topics such as urban infrastructure, education and citizenship, relations between personnel and passengers at the boarding places and in buses, the effectiveness of public policies, modal and tariff integration, among others. In addition, the participants pointed to the lack of awareness and organisation of the civil society, the low compliance with the laws that guarantee the right to access and to the proper circulation of citizens and the strong process of privatisation of public spaces and modes of transport in the region.

The percentage distribution of responses is characterised by high dispersion, as most of the responses obtained less than 5% of mentions. Only the following items obtained a higher percentage of mentions: the holes on sidewalks (15%), the lack of education and respect from citizens (7.5%), the limited number of employees with knowledge in assisting persons with disabilities in bus systems (6.8%) and the defects in tactile paving surfaces for the visually impaired and the areas with obstacles (5.4%).

In order to arrange the problems according to their priority and to organise their connection with mobility policies, we established seven main themes. We found a higher concentration of the problems related to the physical accessibility of urban space (61%) than to the economic or social barriers to the use of the city. The category of physical accessibility includes both the devices that allow accessing public transport systems and the public spaces for collective use in general ([Fig. 10.5](#)).

Regarding physical accessibility to transport systems, the main demands are associated with the limited number of employees for the appropriate functioning of the transport services that would guarantee the operation of platforms in the traditional buses, both for people with motor disabilities and people with visual and hearing impairments (6.8%), the access to the public transport with universal design (4.8%) and the platforms and devices for deaf people (4.8%).



*Fig. 10.5.* Percentage Distribution of the Demands of the Participants of the Focus Group Regarding the Mobility for People with Disabilities in Belo Horizonte, by Thematic Axes. *Source:* Authors' calculations from the results of the accessibility workshop performed on August 24th, 2017.

Belo Horizonte was the first Brazilian city that, in 1999, introduced a high-autonomy low-floor bus with floor-level boarding as a standard model for the municipal public transport fleet. Local private operators, however, resisted the measure and slowed the annual fleet replacement rate. This led to the progressive ageing of the fleet, but the requirement was maintained by the public administrators until 2008 when it was revoked. The city that, in 2001, had 5% of its fleet consisting of these high-autonomy buses quickly removed them from circulation starting with 2008 and now have only buses that are equipped with a platform lift (De Oliveira, 2018a). It should be noted that this type of vehicle does not meet the requirements of the current Brazilian technical standards NBR 14022 (ABNT, 2006), and yet it is still being used in Belo Horizonte.

In 2014, on account of the FIFA Confederations Cup and World Cup, the BRT (bus rapid transit) system of Belo Horizonte, locally called 'Move', was implemented. Thus, the standard of vehicles with floor-level boarding was partially restored in the bus transport system, this time through the deployment of high platforms at the specialised stations of three transport corridors. By coincidence, the buses of this type represent 5% of the total operational bus fleet. Nevertheless, five years later the number of these floor-level boarding buses (that meet the accessibility requirements) remains the same, without any increase since the beginning of the operation (De Oliveira, 2018a).

The traditional bus fleet that provides services to most part of the population depends on manual operators for handling the platform lifts, which is why citizens identify the need for improvement in terms of the number of workers and the quality of care provided to persons with disabilities. In recent years, the

presence of these ‘agents on board’ has been the subject of debates. The owners of transport companies justify dismissal of these agents from the transport systems with the reduction of travel costs. However, this dismissal has led to transport delays and new types of friction between passengers and operators.

Although the regulatory instruments and actions of public agents promote the universal design as a way of improving the quality standards of the urban mobility system, a high level of generalisation of legal provisions opens gaps for non-compliance from the part of private transport operators. The participants of the focus group pointed out that both in conventional buses and the BRT system, people with disabilities remain very dependent on operators and other citizens to solve their daily mobility demands. Thus, the limited number of workers who operate the platform lifts in conjunction with the high dependence of individuals with reduced mobility on these agents form a significant problem for the participants.

The second most important theme is related to the accessibility in public spaces (24.5%). Within this category, the high incidence of holes and the poor quality of public spaces were mentioned as the main issue (15%), followed by the defective/absent signs for visually impaired people (such as tactile paving surfaces) and the strong presence of areas with barriers (which together totalled 5.4%). The complaints regarding the public spaces can be understood as a claim for the right of appropriation and movement in these urban spaces in order to achieve a genuinely inclusive urban experience.

Imrie and Kumar (1998) point out that the configurations of the built environments have complex and daily effects on the material circumstances, identities and experiences of people with disabilities. Although the regulatory instruments prescribe the use of the universal design as a standard, and recognise the lack of physical continuity, homogeneity and adequate signalling as a shared problem, quality remains a complex and conflicting category.

Participants with visually impairment especially pointed out the difficulties for the correct implementation of tactile paving, which, if badly installed, causes more damage and hazards to walkers than its absence. Active representatives of wheelchair users specified the Portuguese pavement as a great enemy of proper circulation through the city. It was stated that this type of pavement, considered by public entities a historical heritage of the city, is always in terrible condition, especially in the central and hospital areas. It should be noted that the universal design rules set out in the plans and standards do not apply to certain areas of the city, as these areas are a subject of negotiations with cultural heritage protection laws.

On the other hand, according to local regulations, the maintenance of sidewalks in Belo Horizonte lies within the responsibility of the owners of the neighbouring properties. Thus, the sidewalks are maintained in an individual manner, yet have a collective impact on the city’s walkable structure. The standardisation rules for sidewalks provided by the Belo Horizonte Mayor’s Office (Belo Horizonte, 2019) seek to set up guidelines that would ensure that sidewalks are more regular, continuous, stable, slip-resistant and without abrupt changes in level or gradients that hinder pedestrian circulation. However, the city plans do not establish instruments for the renewal of urban areas, nor clear procedures

and goals for expanding the range of spaces with universal design. The effective application of the guidelines for the sidewalks is dispersed and depends on the attention of various citizens to the fulfilment of the required accessibility standards. This implies a complex policy of multiple accountability and a high inconsistency and dispersion in the implementation of building standards.

The concentration of demands on the issue of the sidewalks shows strong attention of the focus group participants to the use of public spaces for the circulation of pedestrians or wheelchair users. The 2012 OD survey demonstrated that more than 33% of total travels were done on foot. Nevertheless, the organisation of the city's inner space favours the use of cars, while sidewalks remain almost invisible in mobility policies. This shows that the policies related to mobility spaces are uncoordinated, both with regard to the demands of the citizens who desire more attention to these city spaces and to the very configuration of responsibility attributions that these policies bring. At this point, it is important to emphasise that these spaces of mobility are not just places of transition, but also spaces of sociability and urban experience, which contribute to the construction of citizenship.

As stated by the perspective on disability proposed by [Shakespeare and Watson \(2001\)](#), all individuals, and not only the so-called 'persons with disabilities', are impaired at some level. Thus, it is important to place walking as the centrepiece of accessibility policies and to understand the relevance of the quality of pavements and other walking structures (walkways, crosswalks, etc.) to the mobility of all citizens. Greater attention to the conditions of the city's walkable structure would allow more inclusive access for everyone.

The third important demand was public resource management (15.7%). Focus group participants also shed light on the prevalence of private interests of transport system operators coupled with lack of adequate public policies (3.4%), as well as the non-compliance with laws, lack of political will and state control (giving together 2.7%) and the lack of specific accessibility policies (1.4%). All these demands demonstrate the need for greater accountability of the government and greater participation of citizens in the planning, execution and evaluation of accessibility policies. The fact that the instruments do not make any mention regarding the participation of citizens also contributes to the lack of accountability.

The fourth marked problem is related to the economic accessibility of transport (9.5%), a major issue in the development of the mobility capacity of individuals ([Kaufmann, Bergman, & Joye, 2004](#)). Though residents of RMBH over the age of 65 were entitled to free urban transport four years before this became a constitutional right, there are numerous obstacles to the exercise of this right. Each municipality of the region has its own particular procedures for issuing the gratuity card; it is an institutional barrier that hinders travelling in the region, where the activities are concentrated in the central area. There were also reported barriers related to the number of allowed trips and to the access of accompanying persons. For the people with disabilities, the care expenditures are high, and paired with their vulnerable condition, they reduce their capacity to benefit from the appropriate urban life.

Another substantial demand is related to educating citizens about inclusion (7.5%). It is directly linked to the identification of the lack of dialogue between the State and the citizens about accessibility policies (3.4%), the disrespect of the places reserved for vulnerable groups in the transport systems (2%) and the lack of organisation of the groups of people with disabilities themselves (1.4%). The participants of the focus group identified difficulties faced by the citizens in general, and particularly by the staff members, in dealing with language differences and specific demands of the population with disabilities.

The participants also pointed out the dominance of a homogenising vision, both in the policies and in the daily implementation of transport services, that understand all forms of disability within the scope of the demands of wheelchair users. Especially, deaf and blind people reported that they were always offered wheelchairs in places where they requested some assistance. This approach can be understood as a form of comprehension of this public problem, characterised by the construction of metonymic forms of language that hides or attributes the characteristics of one group to another (Ardila Pinto & Villamizar-Duarte, 2018; Kövecses, 2010).

More specific, but not less important demands for technological development in order to improve the applications that incorporate support for people with reduced mobility were also mentioned (3.4%). In 2015, PBH launched the SIU-Mobile application, which acts as a public transport access tool for its users. This application provides bus arrival forecasts, routes and schedules and has accessibility features for visually impaired persons, allowing them to express their interest in boarding by sending a message to the bus driver. This message appears on the bus control panel of the chosen line. Sheller and Urry (2006) pointed to uniting new communication technologies with urban transport systems, emphasising its influence on mobility patterns, co-presence, social exclusion and safety. The authors state that new technologies support new mobility forms and at the same time are being shaped and remodelled by them. Thus, the implementation of new technologies in urban transport proves to be a potential field to be explored in urban mobility planning.

As mentioned earlier, the analysis of focus group results presented a more complex reality than that portrayed in the policies or OD survey. People with disabilities in Belo Horizonte, like the residents of other cities around the world (Sagaris, 2014), seek to increase spaces for dialogue with public agents, service operators and citizens in general. More than just a homogeneous segregated group that needs special attention, these people fight for disability being approached as a social relationship embodied in time and space, for overcoming the reducing of individuals to the stigma of disability and for the recognition of the potential and diversity of these citizens.

## 5. FINAL CONSIDERATIONS

Both the academic literature and the demands of the citizens are challenging traditional views of disability. Far from being only a problem of physical accessibility to urban space or transport systems, the practices, experiences and

representations of mobility of people with disabilities are part of a broader process of everyday life construction in the cities and of claiming rights to equality from the perspective of diversity. In Belo Horizonte, the technical devices and regulatory instruments have advanced significantly, but remain anchored in dichotomous, inhomogenising, abstract and extremely synthetic visions that pin identities and contribute to deepening the stigmas attached to these groups.

While recent regulatory instruments have introduced universal design as a guiding principle, these changes have not been enough to modify the city's mobility planning and management processes. Public spaces and transportation systems systematically contribute to increasing the exclusion of the population with disabilities, both by the quality and quantity of available physical devices and by the service of the employees. Meanwhile, the population's needs are diverse, both in terms of disability situations, as well as the spaces and agents involved in travelling practices. The urban space plays a key role in imposing barriers to travel at multiple scales.

Additionally, most people with disabilities in the city face high levels of immobility, as well as difficulties in accessing the city's goods and services, especially the services related to health, education and work. The high levels of illiteracy, unemployment and low-income contrast with the high dependence of people with disabilities on public transport and medical services. Thus, the urban space contributes to the intensification of the exclusion of these citizens, especially of the youngest and the poorest in the city. Therefore, the conditions of people with disabilities present a great accumulation of barriers and restrictions in a city that excludes and segregates its population from access to urban goods and services.

Public spaces for walking and public transport are vital to ensure the rights of both this particular group and the general population. However, the dynamics of urban management in these spaces create barriers that prevent their proper use, especially for people with disabilities. The city's transport system is deficient in ramps, turnstiles and adapted stations, as well as in enough information systems to guarantee universal, autonomous and free access for people with disabilities.

The organisational structure of the city's transport system, based on the concession system, with low enforcement capacity, does not offer technological devices nor a sufficient number of qualified employees to include people with disabilities as legitimate users of the system. From the perspective of the participants of the focus group, public policy and urban governance are based on a homogenising vision of citizens that treats them as universal, average users, without particular needs and demands. Special assistance depends on street level bureaucrats, who have high levels of administrative discretion and shape the daily experience of people with disabilities.

Furthermore, public space management is characterised by high dispersion and individualisation in the production of areas suitable for pedestrians in terms of quality and quantity. Sidewalks, ramps and other circulation areas are extremely heterogeneous and hinder a possibility of autonomous and safe use. In view of the lack of provision of adequate spaces and transport systems, the demands of the population with disabilities are varied and require structural changes in urban planning, in provision of public services and transport, as well as in the

attitudes of citizens. The universal design, therefore, requires a broader and more complex application, especially in Latin American countries, with their very poor transportation systems and precarious assistance services. Political mobilisation and the creation of scenarios of participation of the citizens can contribute to the production of more diverse and democratic views on urban life.

This analysis of the practices and demands of the people with disabilities in mobility systems, based on the analysis of quantitative and qualitative methods, constitutes one of the primary efforts made in the city to acknowledge the barriers and challenges that citizens face daily to access urban transport and public spaces in the city, thus exercising their right to mobility. Some of the results show continuity of the situation in other cities. However, we have observed significant differences in regard to the forms of urban management, especially with respect to the public transport sector and to the production of public spaces.

Being a recent concern in the academic studies of the city, there is still the need to go deeper into key aspects such as the inclusion of the theme accessibility for the population with disabilities in normative instruments and in the implementation of local policies. We should particularly advance in the identification of barriers in the different transport modes, as well as in different areas of the city, with different morphological characteristics, use and activity distribution and transport availability. It is also necessary to further explore the organisation forms of this social group and the strategies employed to discuss their demands in the public sphere. Last but not least, it is also fundamental to advance in the understanding of the people's strategies, desires and expectations that challenge our notions of normality and justice with their diverse forms of appropriating and using the city.

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