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Review Article

ACCESSIBILITY OF PUBLIC TRANSPORT FOR PEOPLE WITH DISABILITIES: A SYSTEMATIC LITERATURE REVIEW

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Highlights:

- systematic review on public transport accessibility for people with disabilities;
- limited research examines the actual state of accessibility and compliance with regulations;
- urban buses and physical disabilities are the most studied topics in accessibility research;
- research focuses on accessibility barriers rather than solutions to overcome them;
- identified research gaps in cognitive disabilities and full travel chain accessibility.

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Abstract. The use of public transport is a facilitator for the development of people's abilities and a channel for their participation in society. Mobility limitations are a cause of social exclusion and people with disabilities is one of the groups most likely to suffer from it. Problems using public transportation are among the main causes for this exclusion. The aim of this research is to conduct a systematic review of the published literature on to public transport accessibility for people with disabilities. We have found articles published in peer-reviewed scientific journals between 2010 and 2022, searching in *Web of Science Core Collection* (*WoS*) and *Scopus* databases implementing the Systematic Literature Review (SLR) methodology and applying Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines. Of the 2224 documents found during the initial search, we selected 65 articles according to the criteria used, more than 60% of them published in the last 4 years. Despite the growing literature on public transport and disability, there is still little research into this area, with the urban bus being the most studied mode of transport; and physical disability the most analysed in the articles identified.

Keywords: public transport, transport policy, disability, accessibility, transport disadvantaged, literature review.

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Notations

DOI – digital object identifier;
GCS – global citation score;
IADL – instrumental activities of daily living;
ICT – information and communication technologies;
IPA – importance–performance analysis;
JCR – journal citation reports;
LCS – local citation score;
PRISMA – preferred reporting items for systematic reviews and meta-analyses;
PRM – persons with reduced mobility;
SLR – systematic literature review;
WHO – World Health Organization;
WoS – web of science core collection.

1. Introduction

Transport plays a vital role in many aspects of our daily lives, including access to employment, education, healthcare, recreation, and social events (Bezyak *et al.* 2020).

Access to transportation is essential for people to participate fully in society (Jansuwan *et al.* 2013), and accessibility to public transportation is also seen as an essential element in the lives of people with disabilities or who have reduced mobility, such as the elderly or pregnant women (Park, Chowdhury 2018).

The *Convention on the Rights of Persons with Disabilities* (UN 2006) aims to protect the rights and freedoms of people with disabilities and the obligations of governments to ensure that these rights are respected, protected, and fulfilled. To enable people with disabilities to live independently and participate fully in all aspects of life, governments must act appropriately to ensure their equal

access to transport by identifying and removing barriers to accessibility. The *Global Goals* and the *2030 Agenda for Sustainable Development* underline the importance of providing accessible and sustainable transport systems for all citizens through the development of public transport, with a particular focus on the needs of vulnerable groups such as people with disabilities (Stjernborg 2019).

Facilitating access to transport for people with disabilities is not a marginal issue, and the demand for accessible transport services is expected to grow in the future. According to the WHO, there are 1.3 billion people with disabilities worldwide, about 16% of the population. In addition, as the population ages, there is reason to believe that more and more people will find it difficult to use public transport in the future.

Mobility limitations can be a cause of social exclusion (Preston, Rajé 2007; Preston 2009; Priya, Uteng 2009), and people with disabilities have been identified as one of the groups that can suffer from this (Barnes, Mercer 2005; Casas 2007). Problems using public transport are one of the main causes of this exclusion (Kenyon *et al.* 2003; Wasfi *et al.* 2017).

The aim of this research is to carry out a systematic review of the published literature on the accessibility of public transport for people with disabilities. To this end, we will collect, identify and classify the articles published in scientific journals, analysing aspects such as mode of transport, disability and field of application.

The article is structured as follows:

- current Section 1 is introduction;
- Section 2 describes the methodology used for this systematic review and the process for screening the articles;
- Section 3 presents the results of the quantitative approach;
- in Section 4 we conducted a content analysis of the articles using different classifications;
- Section 5 presents the suggestions for future research directions;
- the article concludes Section 6 with some conclusions.

2. Methodology

Van Wee & Banister (2016) define a *Literature review article* as "a journal article that provides a comprehensive overview of (or a selection of) the literature in a specific area, bringing together the material in a clearly structured way, and adding value through coming to some interesting conclusions". As with all research, a literature review requires the necessary methodology to achieve the proposed objectives.

As with all research, a literature review requires the necessary methodology to achieve the proposed objectives. The methodology used in this research was a SLR. SLR ensures a structured, rigorous and replicable review of the literature, overcoming the weaknesses of other methodologies (Denyer, Tranfield 2009). Specifically, the 5 stages proposed by Tranfield *et al.* (2003) were followed for its development:

- formulating the research question;
- searching literature;
- selecting and evaluating;
- analysing and synthesizing;
- presenting and exploiting results.

Throughout the process we followed the PRISMA (2025) statement and checklist, which is a set of guidelines published to provide more sophisticated and consistent standards for reporting integrated literature or systematic reviews (Swartz 2021). To this end, it includes a 27-item checklist with detailed reporting recommendations, an updated abstract checklist, and a revised flowchart for original and updated reviews (Swartz 2021). In writing this article, we have considered the guidance provided by Van Wee & Banister (2016).

2.1. Formulating the research question

To study the accessibility of public transportation for people with disabilities, we asked the following questions:

- what is the current state of published research on the accessibility of public transportation for people with disabilities?
- which disabilities have been the most studied in relation to public transportation accessibility?
- which modes of transport have been the most studied in relation to accessibility of public transportation for people with disabilities?
- what methods are used to study the accessibility of public transportation for people with disabilities?

This is the explicit statement of the questions that our review addresses.

2.2. Searching literature

This systematic review was conducted between October 2022 and February 2023. We searched records on the *WoS* and the *Scopus* databases. The last search date for updating results in both databases was 25 February 2023. The basic search function that we applied to the abstracts, keywords and titles in both databases was as follows: (Transport* AND Accessib* AND Disabilit*). The asterisk was used to obtain all possible combinations: Transport, Transportation, Accessible, Accessibility, Disability or Disabilities.

2.3. Selecting and evaluating

The processes for selecting and evaluating the literature resulting from the previous stage were defined as follows. Firstly, the criteria for delimiting the results were defined as:

- written in English to facilitate reading by the scientific community;
- the article has a DOI to facilitate unambiguous retrieval of the document;
- an abstract is available for a brief analysis of the objectives, structure, and conclusions;
- published between 2010 and 2022, as these are the most innovative articles;
- articles published in double-blind peer-review journals.

We then removed duplicate records in both databases (*WoS* and *Scopus*). The selection of relevant and important documents to focus on was based on a set of inclusion and exclusion criteria used by Newbert (2007) and Colicchia & Strozzi (2012), reading:

- the abstract to ensure the initial relevance of the article;
- the remaining articles in their entirety to ensure the relevance of their content.

To be included in the review, the article had to focus directly on people with disabilities and their use of public transport. Examples of topics to be excluded were accessible tourism; web accessibility; mobile applications to improve public transportation use; barriers in IADLs; clinical or sociological studies; accessibility of transport in relation to other factors such as income, education level, distances, rural areas, etc.

2.4. Analysing and synthesizing

To facilitate the analysis process, the metadata of the articles were entered into a database created specifically for this research, recording bibliometric data such as: title, authors, type of document, year of publication, journal name, journal volume, journal number, start page, end page, abstract, DOI, keywords, type of disability, mode of transport, type of article, country, scope, etc. From the complete reading, we have classified the articles according to their type.

2.5. Assessing the risk of bias

To assess the risk of bias in the included studies, articles were individually analysed by 2 reviewers and those that might raise doubts about their inclusion or exclusion were subsequently discussed.

Articles were also excluded if, after a thorough reading of their content, there were doubts about their direct relevance to the accessibility of public transport from the perspective of its use by people with disabilities. Once all articles had been analysed, all references and bibliography were extracted to identify related "reference" articles that had not been extracted in the initial search. No articles were identified.

3. Results

The results of the initial searches in *WoS* and *Scopus* are 887 and 1337 documents respectively. 82.14% of the documents published in *Scopus* and 83.87% of those published in *WoS* are from the years between 2010 and 2022, confirming the initial hypothesis of period selection. Applying the initial criteria reduced the results to 528 and 490 documents respectively. Eliminating duplicate records reduced the number of references from 1018 (528+490) to 659. These 659 articles were published in 345 different journals from different disciplines. "Disability and Rehabilitation" is the journal with the most publications (32), "Transportation Research Record: Journal of the Transportation Research Board" is 2nd with 22. 2022 was the year with the highest scientific production, with 66.92% (111) of the articles published in the last 6 years. The number of articles published each year is shown in Figure 1.

The articles were reviewed by eliminating those that did not specifically address the accessibility of public transportation for people with disabilities, and 65 articles were finally selected. All included studies with their main characteristics are presented in Appendix.

16 out of 65 articles (24.62%) were published in 2020, and if only the last 4 years were taken into account, they would account for more than 60% of publications (Figure 2). There are a small number of pre-2014 studies (10.79%).

The journals where it is most published are "Disability and Rehabilitation" and "Transportation Research Part A: Policy and Practice" with 4 articles each, then 3 articles in the journals "Disability & Society", "Transport Policy", "Journal of Transport & Health" and "Disability and Health Journal", 2 articles were published in the "Journal of Air Transport Management", "International Journal of Transport Development and Integration", "International Journal of Transport Development and Integration" and "Sustainability". All these journals are included in *JCR*. The remainder of the 65 selected articles have been published in 37 different journals.

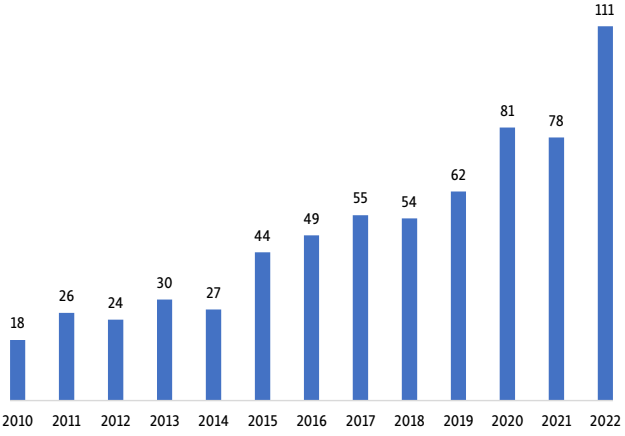

Figure 1. Number of articles by year – primary screening

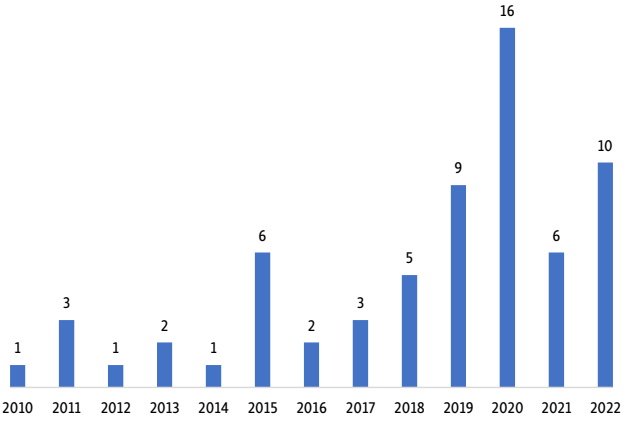

Figure 2. Number of articles by year – selected articles

There are no authors with a large scientific output in this field, only eleven researchers have published more than one article, these are: Aarhaug (Aarhaug, Elvebakk 2015; Visnes Øksenholt, Aarhaug 2018), Bezyak (Bezyak *et al.* 2017, 2020), Duri (Duri, Luke 2022a, 2022b), Chowdhury (Park, Chowdhury 2018, 2022; Park *et al.* 2020), El-Geneidy (Grisé *et al.* 2019; Ross *et al.* 2020), Luke (Duri, Luke 2022a, 2022b), Park (Park, Chowdhury 2018, 2022; Park *et al.* 2020), Pinto (Pinto *et al.* 2020; Rosa *et al.* 2020a, 2020b), Rosa (Pinto *et al.* 2020; Rosa *et al.* 2020a, 2020b), Sabella (Bezyak *et al.* 2017, 2020) and Velho (Velho 2019; Velho *et al.* 2016). The whole process is shown in the Figure 3.

4. Discussion

Although this is an increasingly important issue, there is little research done on the accessibility of public transportation for people with disabilities. In this review we have identified 65 relevant articles, which we will 1st analyse according to different criteria: frequency of citations, type of article, disability analysed, geographical areas, means of transport, tools used to obtain and analyse data and sample size.

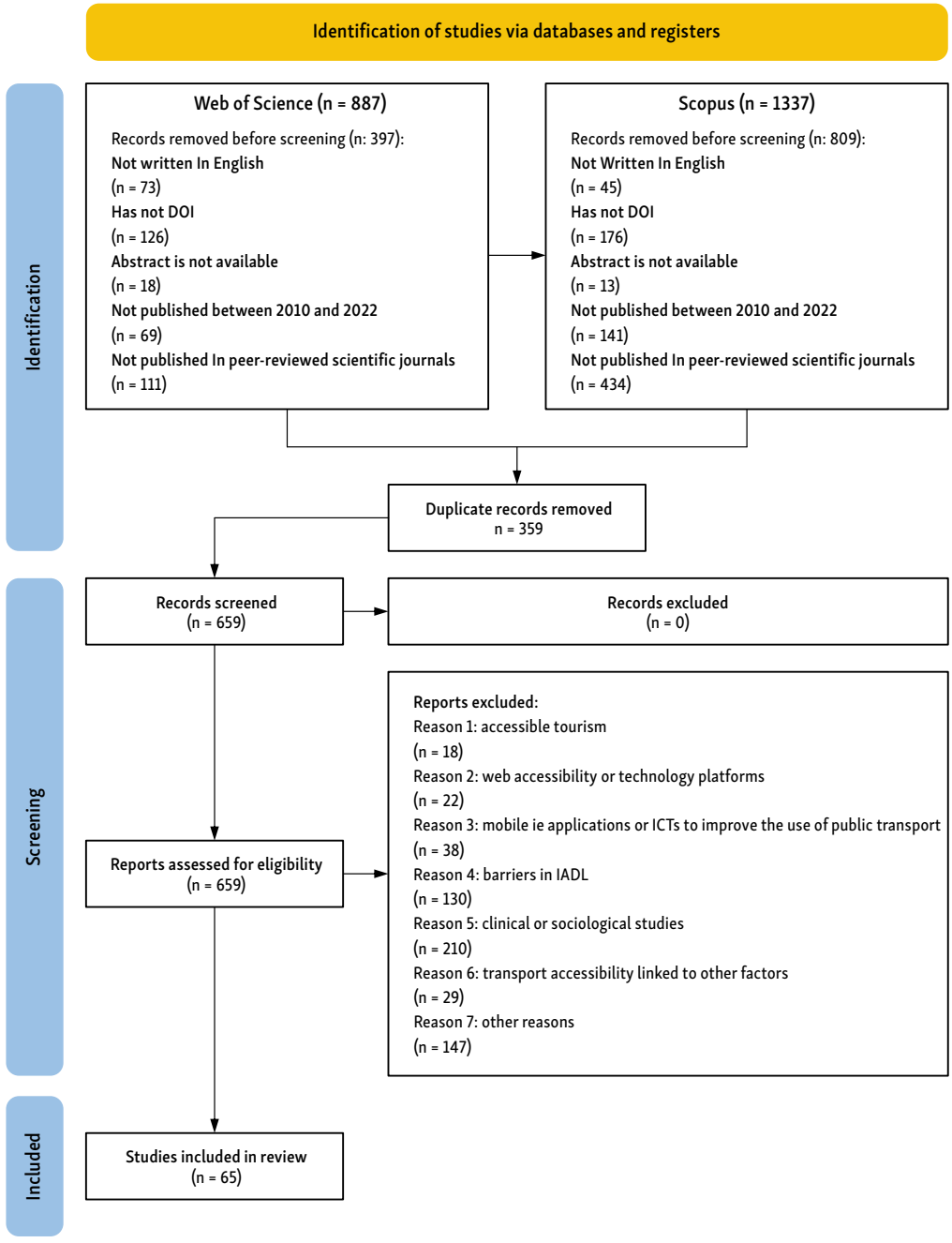

Figure 3. PRISMA flow diagram

4.1. Frequency of citations

The frequency of citations is the most common indicator of the quality or academic impact of research in journals, articles, and authors (Shan, Wang 2018). For each article, we analysed the total citations (GCS) and the citations within the 65 selected articles (LCS). 21 articles have more than 10 citations and 14 (21.54%) have one or no citations. It should be noted that 24.62% were published in the last 2 years, a short period of time to generate citations. Table 1 shows the 10 most cited articles, all of which have 12 or more citations.

The most cited article (Poria *et al.* 2010) identifies barriers and problems in air travel experience for people with physical and visual disabilities. Other highly cited articles are Chang & Chen (2011), which present a study on the perception and satisfaction of air transport services for people with physical disabilities, Park & Chowdhury (2018), who identify key barriers to typical public transit trips for people with disabilities (physical and visual), or Bezyak *et al.* (2017), which discuss the barriers to public transit and complementary paratransit services and possible solutions to improve accessibility. This last article is the most cited in the 65 articles analysed.

In reviewing the bibliography of the 65 articles, we found that 2 articles are particularly relevant. Kenyon *et al.* (2002) introduce mobility as a factor of social exclusion and suggests a strong correlation between inadequate mobility and a lack of access to opportunities, goods and services, and Lucas (2012) links social exclusion and transport and its evolution over the years. Other relevant documents, but not included in the final list are Rosenbloom (2007) and Yau *et al.* (2004) as they were published more than 10 years ago.

There is a dispersion of citations as only 13 documents were cited 3 or more times in the more than 800 references of the 65 articles. Considering this dispersion of citations, together with the low scientific production of the authors of the selected articles, confirms that the accessibility of public transport for people with disabilities is an area of research of recent interest in the scientific community, with isolated groups of authors and without researchers or reference articles.

4.2. Type of article

The articles were classified as:

- "survey" (the articles present the results and conclusions of questionnaires, telephone calls, interviews, focus groups on accessibility of public transport);
- "case study" (if they present the results and conclusions of a field study on accessibility of public transport);
- "theoretical conceptual" (if they present theoretical studies, methodological approaches, etc.);
- "review" (if the articles are a review of articles published in journals, books, regulations, laws, policies, etc.).

Of the articles reviewed, 67.69% (44) were classified as "survey", 18.46% (12) as "case study", 4.62% (3) as "theoretical conceptual" and 9.23% (6) as "review". Some articles could be classified into 2 groups, but we have chosen the category in which it fits better according to the dominant category treated. For example, Mehmood *et al.* (2015) analysed the extent to which the transport interchange in Wolverhampton (UK) met the requirements of the *UK Dis-*

Table 1. Articles with 12 or more citations

Title	Author(s)	Journal	GCS	LCS
The flight experiences of people with disabilities: an exploratory study	Poria *et al.* (2010)	Journal of Travel Research	87	4
Public transportation: an investigation of barriers for people with disabilities	Bezyak *et al.* (2017)	Journal of Disability Policy Studies	75	13
Investigating the barriers in a typical journey by public transport users with disabilities	Park & Chowdhury (2018)	Journal of Transport & Health	49	10
Identifying mobility service needs for disabled air passengers	Chang & Chen (2011)	Tourism Management	41	4
Mobility and access to transport issues as experienced by people with vision impairment living in urban and rural Ireland	Gallagher *et al.* (2011)	Disability and Rehabilitation	39	7
Elevating access: comparing accessibility to jobs by public transport for individuals with and without a physical disability	Grisé *et al.* (2019)	Transportation Research Part A: Policy and Practice	31	5
Community participation and public transportation barriers experienced by people with disabilities	Bezyak *et al.* (2020)	Disability and Rehabilitation	31	2
The impact of universally accessible public transport – a before and after study	Aarhaug & Elvebakk (2015)	Transport Policy	23	5
Transport accessibility for wheelchair users: a qualitative analysis of inclusion and health	Velho (2019)	International Journal of Transportation Science and Technology	22	3
The effect of transport accessibility on the social inclusion of wheelchair users: a mixed method analysis	Velho *et al.* (2016)	Social Inclusion	18	5

Notes: LCS shows the count of citations to a articles within the collection; GCS shows the total number of citations to a articles in the *WoS* and *Scopus*.

ability Discrimination Act 2005. They conducted a survey of disabled users, semi-structured interviews with stakeholders involved in the project, and field audits in 3 transport interchanges. It could have been classified as a survey because it uses questionnaires and interviews. However, we have classified it as a "case study" because it assesses the extent to which a particular transport infrastructure complies with the legislation.

Among the most relevant articles, based on the number of citations, and classified as "surveys", are Gallagher *et al.* (2011), who analysed the mobility and transport access issues faced by visually impaired people in both urban and rural Ireland by conducting 14 focus groups, and possible solutions to improve their independence or Park & Chowdhury (2018), who used semi-structured interviews to identify the main barriers to a typical public transport journey for people with disabilities (physical and visual).

Articles based on statistical analysis were classified as "case study", for example Matuška (2017) who analysed the railway system in the Czechia and its accessibility, making comparisons with neighbouring countries (Austria and Slovakia). Others classified as "case study", but using field observations, are Larkins *et al.* (2011), who studied the accessibility of bus stops on the campus of Clemson University (US), or El Naggar *et al.* (2013), who evaluated the accessibility of Misr railway station (Egypt) and how it could be improved.

In articles classified as "theoretical conceptual", Grisé *et al.* (2019) developed a methodological approach to highlight the differences in job accessibility by public transport in 2 Canadian cities (Montreal and Toronto) between people with a physical disability and the rest of the population using travel time and number of accessible jobs. Jónasdóttir *et al.* (2021) discusses the need for policy development to support community mobility of people with physical disability, and provides recommendations based on human rights, occupational science and the capabilities approach.

Among the articles that have been classified as reviews, Ross *et al.* (2020) discussed the complexities and challenges of providing accessible transport for children with disabilities, while Budd & Ison (2020) reported the results of an analysis of legislation on the rights of air passengers with PRM in 47 countries covering 20 aviation markets and Ferreira *et al.* (2021) examine the accessibility of light rail systems around the world (59 countries) and rank them according to the percentage of stations that have been declared accessible (by consulting official websites). Vanderschuren & Nnene (2021) investigate transport policies and guidelines of 29 African countries regarding the inclusion of people with disabilities.

In summary, articles classified as "survey" are the majority of the research and primarily analyse the barriers perceived by people with disabilities through questionnaires, interviews and focus groups. These studies tend to focus on the local level and may have a sample of one or more disabilities. Articles "case study" focus primarily on analysing the accessibility of a specific infrastructure through direct observation, by checking various criteria and/or checklists. These studies usually conclude with recommendations for improving the accessibility. Those classified as "theoretical conceptual" focus on reviewing, analysing existing information and data in order to propose a methodology, considerations and/or recommendations for policy development. Finally, in the "review", there are 2 types, those that analyse specific transport services for a particular disability and another group that reviews accessibility regulations and policies in different countries.

4.3. Type of disability

In reviewing the disabilities addressed, we find 3 types of articles:

- 1st group of 14 articles refer to the term "persons with disabilities" in a general way without specifying the disabilities considered;
- 2nd group identifies persons with a single type of disability (21), highlighting in this case physical (14) and visual (6);
- 3rd group (the largest with 30) where studies are carried out with a sample of people with different disabilities.

In these cases, if a participant reported a type of disability, it was included. Table 2 shows the number of articles detailing each type of disability, either alone or together with other types of disability.

Physical disability is the most common type of disability in society and has therefore received more attention and research than other types of disability. There is also greater social awareness of this type of disability because physical barriers in public transportation networks are

Table 2. Summary statistics "type of disability"

Category	No of studies	% of total (N = 65)	No of studies together with other types	% of studies in which it is included (N = 65)
"Persons with disabilities" in generic	14	21.54	–	–
More than one disability type	30	46.15	–	–
Physical impairment	14	21.54	40	61.54
Visual impairment	6	9.23	35	53.85
Hearing impairment	0	0.00	20	30.77
Psychical impairment	1	1.54	13	20.00
Others	0	0.00	2	3.08

more visible and obvious to the rest of the population, such as the lack of ramps or lifts in subway stations, or inaccessible buses for a person in a wheelchair. It should be noted, in some articles people with physical disabilities, people with reduced mobility and older people are included in the analysis at the same level. (El Naggar *et al.* 2013; Waara *et al.* 2015; Rosa *et al.* 2020a, 2020b; Szewczyk 2020; Tennakoon *et al.* 2020). This is a logical consequence as they share the same infrastructure and resources and will face similar barriers when using public transport.

Other disabilities, such as hearing and communication, are discussed along with other disabilities. These disabilities are less visible, and there may be less awareness and sensitivity to them in society at large.

4.4. Scope

52.31% (34) of the identified articles have an urban scope, 23.08% (15) have a national scope, 3.08% (2) have a scope of 2 or more countries and 10.77% (7) have a regional or provincial scope. 7 articles do not take place in a specific geographical area or were not identified. Most of the research was carried out at local level, analysing aspects of the public transport system. Only 3 cities are mentioned in more than one article, London (UK) is mentioned 4 times, while Stockholm (Sweden) and Victoria (Australia) appear in 2 articles. There are still a large number of cities and areas that have yet to be studied.

Looking at the countries most represented in the articles, these are the US (8), UK (5) and Canada (3). Research in the Nordic countries, such as Sweden (3) and Norway (2), is also noteworthy.

As shown in the Table 3, Europe is the continent with the highest percentage (36.92%) of research articles (24), if we add North America (12), we obtain that 55.38% of the articles were published in regards to these 2 regions. These are areas with more developed legislation on accessibility, which favours research in this area. 7 articles focus on the Asian continent and the interest in South America is recent, as the articles identified were published in the last 4 years: Calle *et al.* (2022); Hidalgo *et al.* (2020); Márquez *et al.* (2019); Peña Cepeda *et al.* (2018). This study excludes articles not written in English, which may exclude some studies from these countries.

Table 3. Summary statistics "location of studies"

Category	No of studies	% of total (*N* = 65)
Africa	5	7.69
Asia	7	10.77
Australia	6	9.23
Europe	24	36.92
North America	12	18.46
South America	4	6.15
Not in a specific location	7	10.77

4.5. Means of transport

As in previous sections, we can identify 3 types of articles. Those that refer to public transport in a generic way (14) and articles that deal with specific means of transport distinguishing between those that only deal with one mode of transport (31), those that highlight the urban bus (15) followed by the airplane (5), the train (5) and those that consider several modes (bus–train, bus–train–metro, bus–tram, etc.) mostly related with urban transport (20). We counted the number of articles in which each mode of transport is mentioned, either alone or with other modes of transport. The results are shown in Table 4.

Land transport is the most discussed mode in the different articles, appearing in 46 of the 51 (90.19%) articles, with urban transport (bus, metro, taxi, tram) alone accounting for 74.50% of the literature reviewed. These results are to be expected, as urban transport is particularly relevant in the public perception due to its importance in people's daily mobility on their journeys to work or to other activities relevant to their community participation.

Paratransit service is specifically analysed in some studies conducted in the US and Switzerland, as it is an established service in both countries. People with disabilities consider paratransit service important and appreciate it as an alternative to public transport (Egger *et al.* 2022). It should also be noted that the plane is studied independently due to its specificity and its own characteristics.

Table 4. Summary statistics "means of transport"

Category	No of studies	% of total (*N* = 65)	No of studies together with other types	% of studies in which it is included (*N* = 65)
Generic, not a specific means of transport	14	21.54	–	–
Several means of transport	20	30.77	–	–
Bus	15	23.08	35	53.85
Train	5	7.69	20	30.77
Metro	2	3.08	8	12.31
Taxi	0	0.00	4	6.15
Tram	1	1.54	4	6.15
Paratransit service	2	3,08	6	9.23
Plane	5	7.68	5	7.69
Maritime	1	1.54	3	4.62

4.6. Tools and participants

The most common tools used to collect data in the selected articles were questionnaire surveys, interviews and focus groups. 44 articles used a single tool, 17 articles used a combination of 2 tools and in 4 articles used up to 3 tools. Table 5 shows the number of articles in which each tool was used, alone or in combination with other tools.

Questionnaires (face-to-face or online), interviews and focus groups are the main research tools used to gather information about the experiences and barriers faced by people with disabilities when using public transport. In some research, focus groups and interviews involve other stakeholders such as representatives of disability organizations, support staff, flight attendants, drivers, transport planners or policy makers. Field observation is used in work that analyses the condition of an infrastructure, sometimes complementing a qualitative study with the observation of a journey by a person with a disability using public transport.

Because of the novelty of the tool used, it is interesting to highlight the work of Sitter & Mitchell (2020) that uses photovoice to explore paratransit access issues from the perspective of persons with disabilities.

We have also categorized the articles into 3 groups based on sample size:

- small (those with less than 50 participants);
- medium (those with between 50 and 500 participants);
- large (those with more than 500 participants).

15 articles were not included because they did not use tools with a sample of people in their study. Table 6 summarizes this classification.

Most of the research has been conducted with small sample sizes, with focus groups and interviews (semi-structured or in-depth) being the most used tools. Some of the most cited articles are Poria *et al.* (2010), Casey *et al.* (2013) and Velho (2019). The small sample size can be considered a limitation of the research, as it makes it difficult to generalize the results.

Articles with many participants are those that use a Questionnaire survey (face-to-face or online) such as Bezyak *et al.* (2020, 2017) and Peña Cepeda *et al.* (2018). A large sample size allows more accurate and reliable conclusions to be drawn, more types of disabilities to be included in the analysis, the target population to be more adequately represented or more stakeholders to be involved in the research.

Table 6. Summary statistics "sample size"

Category	No of studies	% of total (N = 65)
Small	27	41.54
Medium	17	26.15
Large	6	9.23
Not use tools with a sample of people	15	23.08

4.7. Barriers for people with disabilities

The UN (2006) defined barriers as "any physical or mental structures that may prevent people with disabilities from participating fully and effectively in society on an equal basis with others".

This review confirms Park & Chowdhury (2022) conclusion that "most of the literature has focused separately on segments of a journey when investigating barriers faced by people with disabilities". Very few references have examined barriers in terms of the entire journey: Ahmad (2015), Park & Chowdhury (2018), and Gallagher *et al.* (2011). All elements of the travel chain must be consistently accessible and easy to understand for a journey to be possible for everybody (Rosa *et al.* 2020a, 2020b). The accessibility chain must work properly, for example, if a person cannot get from their home to the bus stop, it is of little use if the bus stop is accessible, nor that the train accessible if the station is not accessible from the entrance to the carriage (Aarhaug, Elvebakk 2015; El Naggar *et al.* 2013).

Inequalities in access to transport and mobility for people with disabilities are related to barriers embedded in the built environment, in transport infrastructure (including public transport vehicles and services), and to social and cultural barriers.

Concerning the built environment, the main barrier is that streets are not designed to be accessible to people with disabilities, making it difficult to access transport stations and to move around a city in general. People with

Table 5. Summary statistics "tools and participants"

Category	No of studies	% of total (N = 65)	No of studies together with other types	% of studies in which it is included (N = 65)
Questionnaires	15	23.08	22	33.85
Interview	7	10.77	19	29.23
Focus groups	7	10.77	15	23.08
Field observation	4	6.15	12	18.46
Review of information	7	10.77	11	16.92
Statistical data	3	4.62	6	9.23
Video recordings	0	0.00	3	4.62
Photovoice	0	0.00	1	1.54
Nominal group technique	1	1.54	1	1.54

disabilities need an accessible pedestrian environment to actively participate in their communities (Prescott *et al.* 2020). Barriers identified in the literature are listed in Table 7.

Missing, poorly maintained or obstructed sidewalks have been identified as a problem for people with physical disabilities, visually impaired and the elderly, as they pose a risk of falling and make it difficult manoeuvre, especially with wheelchairs (Park, Chowdhury 2022). Steep slopes or the lack of sidewalk ramps pose additional challenges for people with physical disabilities and can require them to leave the sidewalk to cross the street.

People with visual impairments face challenges in moving safely and independently due to the difficulty in reading traffic signs for their safety and orientation and the lack of tactile pavement that serve as a valuable tool for guidance and safety while walking (Aarhaug, Elvebakk 2015).

Inadequate design and lack of accessibility in transportation facilities and infrastructure is a recurring barrier (Lope, Dolgun 2020). Table 8 shows the main barriers identified by the research in the transport infrastructure group.

In particular, the gap between the vehicle and the platform is a significant barrier for people with visual and physical disabilities, making it difficult for them to get on or off. Additionally, these individuals have highlighted the need for priority seating close to the driver and the door (Gallagher *et al.* 2011). According to these authors, visually impaired individuals may have difficulty locating seats in transportation due to differences in their interior design, as they rely on their memory for navigation. Also, accessibility technologies and solutions need to be properly maintained and available (König *et al.* 2021). Neglecting to maintain elevators can also have a negative impact on people with physical disabilities (Duri, Luke 2022a; Stjernborg 2019).

In the transport infrastructure group, we have included information barriers that prevent people with disabilities from using public transport effectively. The main barriers identified include a lack of accessible information in different formats such as Braille, large clear text and audio announcements, lack of or unclear signage and conflicting information, which can cause confusion and make the planning of the journey difficult.

Table 7. Main barriers identified in the literature in group "built environment"

Barrier	Studied by
Lack of pavement or in poor condition/ obstructions on sidewalks	Ahmad (2015); Hidalgo *et al.* (2020); Park & Chowdhury (2018); Vanderschuren & Nnene (2021)
Steep slopes, high kerbs or lack of sidewalks ramps	Aarhaug & Elvebakk (2015); Mehmood *et al.* (2015); Park & Chowdhury (2018)
Lack of tactile pavement	Aarhaug & Elvebakk (2015); Low *et al.* (2020); Mehmood *et al.* (2015); Vanderschuren & Nnene (2021)
Lack of lighting and security; Climate conditions	Ahmad (2015); Bezyak *et al.* (2017); Hidalgo *et al.* (2020)

Table 8. Main barriers identified in the literature in group "transport infrastructure"

Barrier	Studied by
Vehicle or infrastructure inaccessible or poorly designed	Ahmad (2015); Bęczkowska & Zysk (2021); Gallagher *et al.* (2011); Lindqvist & Lundälv (2012); Velho (2019)
Lack of space / difficulty in manoeuvring a wheelchair	Aarhaug & Elvebakk (2015); Ahmad (2015); Chang & Chen (2011); Duri & Luke (2022a); El Naggar *et al.* (2013); Mehmood *et al.* (2015); Odame *et al.* (2020); Park & Chowdhury (2018); Velho (2019); Wang & Cole (2014)
Lack of adapted toilets	Ahmad (2015); Chang & Chen (2011); Duri & Luke (2022a); Ercoli *et al.* (2015); Mehmood *et al.* (2015); Park & Chowdhury (2018); Wang & Cole (2014)
Inaccessible or poorly positioned seats	Aarhaug & Elvebakk (2015); Chang & Chen (2011); El Naggar *et al.* (2013); Gallagher *et al.* (2011); Odame *et al.* (2020); Visnes Øksenholt & Aarhaug (2018); Wang & Cole (2014)
Lack of lifts / ramps with barriers	Chang & Chen (2011); Duri & Luke (2022a); El Naggar *et al.* (2013); Enginöz & Şavlı (2016); Ercoli *et al.* (2015); Lindqvist & Lundälv (2012)
Gap between bus or train and platform / problems getting on and off	Ahmad (2015); Aarhaug & Elvebakk (2015); Bezyak *et al.* (2017); El Naggar *et al.* (2013); Hidalgo *et al.* (2020); Visnes Øksenholt & Aarhaug (2018)
Lack of spoken information	Aarhaug & Elvebakk (2015); Bęczkowska & Zysk (2021); Bezyak *et al.* (2017); Casey *et al.* (2013); Hidalgo *et al.* (2020); Low *et al.* (2020)
Lack of information or information that is difficult to read or understand	Aarhaug & Elvebakk (2015); Ahmad (2015); Bęczkowska & Zysk (2021); Bezyak *et al.* (2017); Casey *et al.* (2013); El Naggar *et al.* (2013); Enginöz & Şavlı (2016); Ercoli *et al.* (2015); Hidalgo *et al.* (2020); Gallagher *et al.* (2011); Lindqvist & Lundälv (2012); Park & Chowdhury (2018); Wasfi *et al.* (2017)
Absence of shelters	Ahmad (2015); Duri & Luke (2022a); Park & Chowdhury (2018)

Finally, social and cultural barriers refer to negative attitudes and perceptions towards persons with disabilities, including lack of awareness and sensitivity among the general population and transport staff. Negative attitudes of drivers or staff, such as prejudice and discrimination, can make people with disabilities feel unwelcome when using public transport. However, well-trained and sensitized drivers can help people with disabilities to feel safer when using public transport. The social and cultural barriers remain a major barrier for people with disabilities requiring a commitment to long-term action at micro and macro levels (Bezyak *et al.* 2017). Table 9 shows main barriers identified in the literature in this group.

A number of studies identify staff behaviour as a barrier to public transport access for people with disability (Ahmad 2015; Bezyak *et al.* 2017; Das Neves *et al.* 2023; Odame *et al.* 2020; Visnes Øksenholt, Aarhaug 2018). Negative attitudes and a lack of driver training and transport staff towards people with disabilities have been identified as a major barrier (Park, Chowdhury 2018), as people with disabilities sometimes stop or reduce their use of transportation due to negative experiences with drivers (Das Neves *et al.* 2023).

The lack of in-trip assistance personnel is an additional barrier to public transport use, especially for people who need help navigating the station or boarding and exiting the vehicle (Low *et al.* 2020).

The literature shows barriers in low- and middle-income countries, such as Sri Lanka, Bangladesh, Indonesia, Pakistan or South Africa, are different from those identified in the UK, Norway, Ireland or the US. This conclusion can be drawn from research such as Ahmad (2015), Batdulam *et al.* (2019), Duri & Luke (2022b); Vanderschuren & Nnene (2021) or Sajib (2022). While legislation is more advanced in developed countries, but there is still a serious lack of transportation and disability policy and legislation in low and middle income countries (Vanderschuren, Nnene 2021), although it should be noted that there is a growing interest in improving mobility and accessibility for people with disabilities in these countries (Ahmad 2015).

Barriers to public transportation identified in the literature have a negative impact on the ability of people with disabilities to participate in the community, resulting in increased reliance on friends and family and limited access to health, social and rehabilitation services (Das Neves *et al.* 2023; Gallagher *et al.* 2011; Bezyak *et al.* 2017). People with disabilities often face additional costs in meeting their basic needs and participating in economic activities due to the lack of accessible transport (Ahmad 2015). Therefore, addressing these barriers is critical to ensuring full community participation, economic stability and social inclusion.

4.8. Limitations and strengths

There are some limitations to this review. The initial selection may have been influenced by the Boolean operator AND, omitting articles that did not contain all the words, or that used similar words (e.g., mobility). There may have also been articles that were of great interest for the use of public transport by people with disabilities but were filtered out because their main topic was accessible tourism or barriers in IADLs.

Our review has omitted studies not published in peer-reviewed journals, works such as *Conference Article*, *Proceedings Article* or *Book Chapter*, or those published in a language other than English or before 2010. Neither were the articles that were not included in the databases we used (*WoS* and *Scopus*).

Articles were analysed individually by 2 reviewers, and those that might raise questions for inclusion or exclusion were subsequently discussed. However, other researchers at their discretion could include articles with relevant conclusions and information.

The strengths of the review have been the specific focus on the use of public transport by people with disabilities, in order to study the evolution of research, the most studied disabilities or means of transport and the most relevant aspects discussed (e.g., barriers and limitations). The study has ensured methodological quality as it has been carried out in accordance with the PRISMA (2025) declaration and checklist.

5. Future research directions

This review has analysed the accessibility of public transport for people with disabilities. It is recommended that future research on this topic consider the following key points to address the limitations of the current literature:

- conduct studies on the degree of compliance with legislation on infrastructures and means of transport. These

Table 9. Main barriers identified in the literature in group "social and cultural barriers"

Barrier	Study
Lack of information or knowledge from drivers	Aarhaug & Elvebakk (2015); Bezyak *et al.* (2017); Hidalgo *et al.* (2020); Gallagher *et al.* (2011)
Inappropriate driver attitude	Aarhaug & Elvebakk (2015); Bezyak *et al.* (2017); Calle *et al.* (2022); Das Neves *et al.* (2023); Hidalgo *et al.* (2020); König *et al.* (2021); Odame *et al.* (2020); Visnes Øksenholt & Aarhaug (2018); Park & Chowdhury (2018); Stjernborg (2019); Velho (2019)
Feeling of a hostile environment created by other passengers	Bigby *et al.* (2019); Calle *et al.* (2022)
Lack of in-trip assistance personnel	König *et al.* (2021); Low *et al.* (2020)

should be carried out by means of the use of field work through direct observation. It should be assumed that this work is difficult to carry out due to the time and cost involved. Logically, these studies must be planned taking into account the geographical scope of the means of transport analysed;
- investigate barriers in public transportation access and solutions for under-analysed disabilities and in any mode of transportation (e.g., cognitive disabilities);
- conduct research studies that analyse the accessible journey chain when investigating barriers to travel by public transport;
- conduct studies on a single disability with a more in-depth analysis (although a person may have several disabilities), to analyse the effectiveness of existing regulations and to be able to propose measures to facilitate access for people with disabilities;
- analyse the development and implementation of accessibility policies to ensure access to public transport for people with disabilities in different countries or geographical areas (for example, the EU, the UK or the US);
- investigate barriers in public transport for people with disabilities from the point of view of drivers, support staff and transport company managers.

6. Conclusions

This literature review has examined the existing literature on public transport accessibility for people with disabilities. For its elaboration, we have combined methodologies validated by authors in other works (SLR) and the guidelines of the PRISMA (2025) declaration for the correct performance of systematic reviews.

Despite the growing literature on public transport and disability, research in this area is still scarce, carried out by several authors but with low frequency of publication and unrelated to each other. There is not a relevant amount of work dealing with the actual state of accessibility of public transport. Most of it is based on the perceptions of people with disabilities, but recently other stakeholders such as support staff, flight attendants, drivers, transport planners and policy makers are being included. Among the modes of transport, the urban bus is the most studied.

The existing literature mainly conducts qualitative studies through interviews or focus groups, with a small sample size, and there are few articles observing the accessibility situation in the field. There is a lack of studies on the degree of compliance with legislation on infrastructure and means of transport.

Most research has focused on the barriers experienced by people with disabilities in transportation, rather than on solutions to these barriers. In particular, research has focused mainly on physical barriers, both in the urban environment and in the transportation infrastructure, and on information barriers, rather than on social and cultural barriers. In terms of solutions, the greatest efforts have been made to remove physical barriers (Lindqvist, Lundälv 2012).

Despite legislation designed to increase participation, facilitate independence and improve access for people with disabilities, and considering significant advances in accessibility, there are still barriers present that prevent people with disabilities from accessing public transportation and may discourage them from using it. This is reflected in the articles analysing compliance with legislation.These improvements have had a positive impact on reducing the exclusion of people with disabilities (Larkins *et al.* 2011; Aarhaug, Elvebakk 2015; Mehmood *et al.* 2015; Enginöz, Şavlı 2016; Park *et al.* 2020).

The type of disability influences the perceived barriers to using public transport; different disabilities create different barriers (Park, Chowdhury, 2018), although there are also commonalities. The research reviewed suggests that people with physical and visual disabilities face more significant barriers than those with a hearing impairments or other disability, and these are also the most studied disabilities. Bezyak *et al.* (2017) found that people with visual and physical disabilities experienced a greater number of barriers than those with hearing impairment or other disability categories, highlighting the need for targeted interventions for these populations.

People with physical disabilities face barriers mainly in the urban environments, access to transportation, inaccessible seating and toilets, lack of space for wheelchairs, difficulty in manoeuvring a wheelchair or lack of lifts in facilities, among others. As a result, trips can become longer and more complicated when wheelchair accessibility becomes a transportation barrier (Ferrari *et al.* 2014; Wang, Cole 2014). People with visual impairments cite lack of visual cues and audio announcements, limited access to information and lack of staff as the main barriers.

Barriers to public transportation for people with hearing, communication, sensory, linguistic or cognitive disabilities have been little studied. People with hearing impairments face barriers related to information and communication, such as the absence of visual stops and destination announcements, difficulty in identifying vehicle numbers, lack of priority seating, timely public information systems or lack of alternative communication and sign language interpreters.

Accessibility of public transport depends not only on the environment and infrastructure, but also on adequate organization and trained staff (Bęczkowska, Zysk 2021). Therefore, it takes more than good technical solutions to make public transport work.

Public transport drivers are an essential part of the service and have the power to act as barriers or social facilitators in the lives of people with disabilities, well-trained drivers can significantly improve the travel experience and encourage people with disabilities to travel independently (Park, Chowdhury 2018). The attitudes, experiences and knowledge of transport drivers need to be studied to improve the system. It is also important to train and raise awareness among drivers to maintain universality (Aarhaug, Elvebakk 2015; Casey *et al.* 2013; Lindsay 2020;

Park, Chowdhury 2018). There is still limited knowledge of the barriers faced by people with disabilities from the perspective of public transport drivers and more research is needed (Calle *et al.* 2022; Das Neves *et al.* 2023).

Universal design is a concept that aims to give all people, regardless of ability, the right to access and use the same public systems with the same level of service (Evcil 2009; Imrie, Kumar 1998). This approach has been more widely implemented in more advanced countries due to their specific legislation and regulations. In countries with less developed accessibility legislation or significant financial constraints, the principles of universal design are less widely applied, making it difficult to implement inclusive transport planning, which further hinders access to different opportunities for people with disabilities (Duri, Luke 2022b; Vanderschuren, Nnene 2021). Universal design has been shown to be cost-effective even at low ridership levels (Aarhaug, Elvebakk 2015). Kim *et al.* (2020) concluded that bus stop improvements made by the Utah Transit Authority (US) were associated with a statistically significant increase in overall ridership and a decrease in demand for paratransit services. Periodic accessibility audits of the accessibility of transport infrastructure are recommended to monitor progress towards universal design by encouraging the participation of people with disabilities, and to improve policies and legislation on the provision of universally accessible transport infrastructure and services in countries where they are not yet well developed.

Improving accessible public transportation is both economically and socially necessary. It can help improve social equity, reduce the unemployment rate of people with disabilities who face travel barriers that limit access to employment opportunities, increase access to higher education for students with disabilities, or increase overall public transportation ridership by reducing the use of private vehicles or the demand for paratransit services.

Eliminating barriers to public transportation for people with disabilities requires a comprehensive approach that includes improvements to the built environment, transportation infrastructure, provision of assistive services, awareness and training programs for public transportation drivers that focus on developing communication and interaction skills, and cooperation with organizations of people with disabilities.

Ensuring that universal design principles are met in a city's built environment takes much longer due to the financial and engineering challenges involved (Grisé *et al.* 2019; Márquez *et al.* 2019), while progress in accessibility of the medium (bus, taxi, train) or infrastructure (station, interchange) is faster. To be effective, the entire transportation system must be accessible and that it must be predictable and reliable (Lindqvist, Lundälv 2012). Aarhaug & Elvebakk (2015) found that despite improvements to bus stops, people with physical disabilities preferred to use a car due to uncertainty about the accessibility of stops relevant to them. Understanding the specific needs of people with disabilities prior to their transport experience can also improve accessibility and ensure the successful design of an urban public transport environment, the participation of people with disabilities in transport planning and design is essential to meet their mobility needs in society (Duri, Luke 2022b). To achieve this goal, it is important to ensure adequate communication encounters between participants, prior to their experience (Cerdán-Chiscano 2021).

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Author contributions

Angel M. Gento management and coordination for the research activity planning and execution.

Juan L. Elorduy and *Angel M. Gento* designed the study and the formulation of the overall research objectives and goals.

Juan L. Elorduy developing the database created specifically for this research, scrubbing data and maintaining research data.

Juan L. Elorduy analysis and synthesis of study data.

Juan L. Elorduy wrote the 1st draft of the article.

Angel M. Gento revised and edited the article and supervised the research.

Disclosure statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article.

Appendix. Articles included in the review

Reference	Cited by	Type of article	Type of disability	Scope	Means of transport	Tools	Participants	Description
Aarhaug & Elvebakk (2015)	23	survey	▪ visual; ▪ physical	6 Norwegian cities	▪ bus; ▪ train	▪ quantitative surveys of all passengers; ▪ individual qualitative case studies of persons with disabilities	***large*** 699 surveys before study and 1018 after study; 17 case studies were conducted for the before study, and 6 for the after study	this article examines the impact of universal design measures on public transport, and how they can positively influence the use of public transport by both disabled and non-disabled passengers
Ahmad (2015)	8	survey	physical	Dera Ghazi Khan, Rajanpur (Pakistan)	bus	questionnaire survey	***medium*** 245 people with physical disabilities	study to assess the level of accessibility of public transport for people with physical disabilities in rural areas and to identify the barriers that prevent them from using different transport services
Calle *et al.* (2022)	2	survey	generic	Atacama (Chile)	▪ bus; ▪ taxi	individual in-depth interviews	***small*** 57 public transportation drivers in the Atacama region of Northern Chile	this study examined access to transport for people with disabilities through the accounts of public transport drivers in Northern Chile, highlighting gaps and limitations in the system
Batdulam *et al.* (2019)	2	survey	▪ visual; ▪ hearing; ▪ communication	Mongolia	bus	questionnaire model SERVQUAL	***medium*** 100 people with disabilities	to measure the quality and accessibility of public transport, a standardised questionnaire consisting of 51 questions from the internationally recognised SERVQUAL (multi-dimensional research instrument) was used
Bęczkowska & Zysk (2021)	3	survey	visual	Warszawa (Poland)	bus	questionnaire survey	***small*** 30 visually impaired people	review of the organisational and legal solutions for the safety and security of people with special needs on public transport
Bezyak *et al.* (2017)	75	survey	▪ physical; ▪ visual; ▪ hearing; ▪ psychical; ▪ speech; ▪ communication	US	general	questionnaire survey online	***large*** 4161 people with disabilities using public transport	study of the barriers to public transport and to complementary paratransit services, as well as of possible solutions to improve accessibility
Bezyak *et al.* (2020)	31	survey	▪ physical; ▪ visual; ▪ hearing; ▪ psychical; ▪ speech; ▪ communication	US	general	questionnaire survey online	***large*** 1748 people with disabilities	discusses the barriers and supports to accessing public transport for people with disabilities and its impact on their community participation
Bigby *et al.* (2019)	8	survey	▪ hearing; ▪ visual; ▪ communication	Victoria (Australia)	train	▪ individual semi-structured interviews; ▪ focus group	***small*** 21 people with disabilities	this study investigated the experiences of people with communication disabilities on a rail network in Victoria (Australia) to identify the barriers they face
Budd & Ison (2020)	4	review	generic	general	plane	review of information (legislation)	n/a	reports on the findings of an international survey of legislation on the rights of air passengers with disabilities in 47 countries
Casey *et al.* (2013)	4	survey	visual	large urban area of Ireland	▪ bus; ▪ train	▪ focus group with visually impaired people; ▪ individual interviews with access officers of 2 public transport organizations in the area	***small*** 13 visually impaired people and the access officers from 2 public transport organisations in the area	this research explores the needs and experiences of people with sight loss regarding access to bus and rail services in a large urban area in Ireland, using qualitative methods
Cerdán-Chiscano (2021)	1	survey	▪ visual; ▪ physical; ▪ psychical	Barcelona (Spain)	metro	▪ focus group; ▪ surveys with semi-structured questionnaire; ▪ direct observation using public transport	***small*** 37 people with disabilities	this article examines the impact of including people with disabilities in the design of urban public transport service environments and provides guidance to transport network managers on how to allocate appropriate adapted communication resources
Chang & Chen (2011)	41	survey	physical	Taiwan	plane	questionnaire survey	***medium*** 130 people with disabilities	examines the perception of, and satisfaction with, air transportation services for people with disabilities using IPA; the results show the service needs are different across 3 levels of disability
Das Neves *et al.* (2023)	0	survey	▪ physical; ▪ visual; ▪ hearing; ▪ psychical; ▪ communication; ▪ others	Australia	bus	▪ questionnaire survey; ▪ focus group	***medium*** 120 people with disabilities	investigates the attitudinal, behavioural and communication barriers experienced by disabled transport users due to negative attitudes of bus drivers, which restricts their community mobility

Reference	Cited by	Type of article	Type of disability	Scope	Means of transport	Tools	Participants	Description
Đorđević *et al.* (2019)	12	survey	▪ physical; ▪ visual; ▪ hearing; ▪ psychical; ▪ communication; ▪ others	Serbia	train	questionnaire survey	***medium*** 99 people with disabilities	a new model for selecting criteria to measure the quality of passenger service in rail transport from the perspective of persons with disabilities
Duri & Luke (2022a)	0	survey	▪ physical; ▪ visual; ▪ hearing	Tshwane (South Africa)	▪ bus; ▪ train	questionnaire survey	***medium*** 384 people with disabilities	the aim of the study was to investigate the structural barriers experienced by people with disabilities in accessing transport
Duri & Luke (2022b)	0	review	▪ physical; ▪ visual; ▪ hearing, ▪ communication	Africa	general	review of information (SLR)	n/a	discusses the transport barriers encountered by people with disability in Africa (SLR) and provides insights into how policymakers can provide universally accessible transportation
Egger *et al.* (2022)	0	survey	▪ physical; ▪ visual; ▪ communication	Switzerland	paratransit service	focus group	***small*** 31 people with disabilities	this study aims to identify the experiences of persons with disabilities in Switzerland when using paratransit services, explore their needs and examine how barriers and facilitators influence participation in different areas of life
El Naggar *et al.* (2013)	1	case study	physical	Alexandria (Egypt)	train	field observation	n/a	evaluation of the city's main railway station "Misr railway station" as a case study, located in the centre of the city, documenting the accessibility of the station in its current state and the applicability of new solutions
Enginöz & Şavlı (2016)	1	case study	▪ visual; ▪ physical	Istanbul (Turkey)	metro	field observation	***small*** 5 visually impaired and partially impaired people and 7 wheelchair users	study of the accessibility of a metro station by means of a survey and a journey made by people with physical and visual disabilities
Ercoli *et al.* (2015)	1	case study	generic	Izmir (Turkey)	ferry	▪ field observation; ▪ questionnaire survey; ▪ individual interview	***medium*** 233 Passengers (with and without disabilities); delegates of the service operator and to expert members of associations for persons with disabilities	reports the results of a multi-method study of the accessibility of the ferry system in service in Izmir (Turkey)
Ferreira *et al.* (2021)	5	review	physical	general	train	review of information (official websites)	n/a	the study examines the wheelchair accessibility of light rail systems around the world and ranks them according to the percentage of adapted stations they report; the official websites of 212 light rail systems operating in 59 countries around the world are consulted
Gallagher *et al.* (2011)	39	survey	visual	Ireland	▪ bus; ▪ taxi; ▪ train	focus groups	***medium*** 121 people with vision impairment resident in both urban and rural Ireland	study through 14 focus groups about the mobility and access to transport issues of urban and rural dwelling people with vision impairment in Ireland
Grisé *et al.* (2019)	31	theoretical conceptual	physical	Montreal, Toronto (Canada)	▪ bus; ▪ metro; ▪ train; paratransit service	review of information	n/a	this article examines the issue of equal access to opportunities in public transport planning and how physical barriers can make it difficult for people with disabilities to take advantage of these opportunities; the study focuses on 2 major Canadian cities – Montreal and Toronto – by measuring the accessibility of jobs via public transport for wheelchair users living in socially disadvantaged areas
Hidalgo *et al.* (2020)	0	case study	▪ physical; ▪ visual; ▪ hearing; ▪ psychical	▪ Bogota, Medellin (Colombia); ▪ Santiago (Chile)	▪ bus; ▪ metro; ▪ train	field observation	***small*** 24 people with disabilities	analyses the public transport travel experience of people with permanent or temporary disabilities or mobility restrictions
Jónasdóttir *et al.* (2021)	2	theoretical conceptual	generic	Iceland	general	▪ review of legislation; ▪ focus group	***small*** 6 people with mobility impairments and 6 people providing services for disabled people	discusses the need for policy development to support community mobility for people with mobility impairments and makes recommendations based on human rights, occupational science and the capabilities approach
Kim *et al.* (2020)	5	case study	generic	Salt Lake (US)	bus	statistical analysis	n/a	this study analyses the effects of bus stop improvements made by Utah Transit Authority (US) on ridership and demand for Americans with Disabilities Act paratransit service

Reference	Cited by	Type of article	Type of disability	Scope	Means of transport	Tools	Participants	Description
King *et al.* (2018)	5	case study	▪ physical; ▪ visual	Phnom Penh (Cambodia)	bus	▪ focus group; ▪ field observation	***small*** 21 persons with disabilities and assistants	this article describes a formative evaluation process of the journey access tool to identify transport barriers for people with disabilities, such as lack of infrastructure or unsafe roads, which prevent these people from accessing health, education and employment services
König *et al.* (2021)	2	survey	▪ physical; ▪ visual	▪ Bologna, Cagliari (Italy); ▪ Brussels (Belgium); ▪ Lisbon (Portugal); ▪ Sofia (Bulgaria); ▪ Stockholm (Sweden); ▪ Zagreb Croatia)	general	▪ review of information (social media content analysis); ▪ semi-structured interviews	***small*** 49 persons with disabilities	presents the results of 2 qualitative studies carried out with people with different types of disability to identify the barriers they face when travelling by public transport
Kostyniuk & D'Souza (2020)	4	case study	physical	Ann Arbor (US)	bus	▪ video recordings ▪ statistical analysis	n/a	this article discusses the factors related to dwell time in fixed transit bus operations and when and how they affect it can be beneficial to transit system operations
Larkins *et al.* (2011)	2	case study	generic	Clemson (US)	bus	field observation	n/a	accessibility study of bus stops around Clemson University Campus (US)
Levesque (2022)	0	theoretical conceptual	generic	New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland, Labrador (Canada)	general	▪ review of information (searches for written and internet information); ▪ semi-structured interviews	***small*** 18 managers of public transport service providers	study on the provision of accessible rural transport in unpopulated regions of Canada
Lindqvist & Lundälv (2012)	5	survey	▪ physical; ▪ neuropsychiatric; ▪ hearing; visual	Sweden	general	focus groups	***small*** 21 people with disabilities	the study explores the accessibility of public transport and participation in working life experienced by people with disabilities
Lindsay (2020)	7	survey	▪ physical; ▪ psychical	general	▪ bus; ▪ metro; ▪ train; ▪ tram; ▪ paratransit service	nominal group technique	***small*** 15 persons: rehabilitation physicians; stakeholders in accessible transport; young people with disabilities and their parents	explore solutions to the challenges that youth with disabilities encounter in accessing and navigating transportation; proposed 122 solutions
Lope & Dolgun (2020)	11	case study	generic	Melbourne (Australia)	tram	statistical analysis	n/a	the study estimate the current access of the disabled population to trams services in Melbourne (Australia); the results show that there is inequality in the accessible trams amongst people with a disability
Low *et al.* (2020)	16	survey	visual	London (UK)	▪ bus; ▪ metro; ▪ train	semi-structured interviews	***small*** 23 visually impaired people	study through 23 semi-structured interviews on the travel experience of visually impaired people on the London public transport system (UK)
Major & Hubbard (2019)	2	survey	generic	US	plane	▪ statistical analysis; ▪ online survey	***small*** 102 people with disabilities	study of air service for passengers with disabilities in the US with a quantitative analysis of complaints and a qualitative analysis of survey data
Márquez *et al.* (2019)	9	survey	physical	Tunja (Colombia)	▪ bus; ▪ taxi; paratransit service	▪ focus group; ▪ questionnaire survey	***small*** 150 people with physical disability	studies factors affecting personal autonomy and perceived accessibility of people with mobility impairments in an urban transportation choice context, taking the city of Tunja (Colombia)
Matuška (2017)	4	case study	physical	Czechia	train	▪ review of information; ▪ statistical analysis	n/a	analyses the railway system of the Czechia and its accessibility, makes comparisons with neighbouring countries (Austria and Slovakia)
Mehmood *et al.* (2015)	2	case study	▪ visual; ▪ physical; ▪ hearing; ▪ cognitive; ▪ speech	Wolverhampton (UK)	▪ bus; ▪ train	▪ questionnaire survey online; ▪ semi-structured interviews. ▪ field observation	***small*** 21 people with disabilities	this article presents the results of a study to assess the extent to which the Wolverhampton Transport Interchange project meets the requirements of the *UK Disability Discrimination Act 2005*
Middleton & Byles (2019)	16	survey	visual	London (UK)	general	▪ video recordings with a *Go Pro*; ▪ semi-structured interviews	***small*** 8 visually impaired youths	examines the everyday mobilities of a group of visually impaired young people in London (UK)
Odame *et al.* (2020)	3	survey	▪ visual; ▪ physical	Cape Coast (Ghana)	bus	▪ unstructured interview; ▪ field observation	***small*** 32 people with disabilities (31 visual and 1 physical)	this study was carried out to examine the road transport infrastructure and mobility needs of students with disability at the University of Cape Coast (Ghana)

Reference	Cited by	Type of article	Type of disability	Scope	Means of transport	Tools	Participants	Description
Visnes Øksenholt & Aarhaug (2018)	11	case study	▪ physical; ▪ visual; ▪ hearing; ▪ psychical	Oslo (Norway)	▪ bus; ▪ train; ▪ metro	▪ semi-structured interviews; ▪ field observation	***small*** 14 people with disabilities	explorative case study of why non-users with impairments do not choose public transport
Park & Chowdhury (2018)	49	survey	▪ visual; ▪ physical	city	▪ bus; ▪ train; ▪ ferry	semi-structured interviews	***small*** 32 people with disabilities (15 physical, 17 visual)	identify the key barriers in typical public transport journeys undertaken by people with disabilities
Park & Chowdhury (2022)	2	review	▪ physical; ▪ visual; ▪ hearing; ▪ psychical	general	general	review of information	n/a	this review provides an examination of the barriers faced by people with disabilities in using public transport independently
Park *et al.* (2020)	6	survey	generic	New Zealand	general	questionnaire survey	***small*** 32 people with disabilities	this study investigates the existence of any gaps in users' needs (previous study with people with disabilities) and practitioners' prioritization of accessibility features
Peña Cepeda *et al.* (2018)	11	survey	physical	Santiago (Chile)	bus	questionnaire survey	***large*** 1356 People with disabilities	this study values accessibility elements in the urban bus system of public transport in Santiago (Chile) and analyse the willingness to pay for improving the accessibility
Poria *et al.* (2010)	87	survey	▪ visual; ▪ physical	Israel	plane	individual in-depth interviews	***small*** 45 people with disabilities (30 physical, 15 visual) who had had at least one experience of flying abroad	study through in-depth interviews on the flight experience; identify barriers and problems in the travel chain; the findings reflect greater difficulty for people with physical disabilities
Putranto & Putri (2018)	1	survey	visual	Jakarta (Indonesia)	▪ bus; ▪ train	▪ focus group; ▪ field observation	***small*** 15 visually impaired people	study on the use of and barriers to the use of public transport by people with visual impairment
Remillard *et al.* (2022)	9	survey	▪ physical; ▪ hearing; ▪ visual	US	▪ bus; ▪ taxi; ▪ paratran-sit service	semi-structured interviews	***medium*** 180 people with disabilities	this study presents a detailed overview of the transportation challenges experienced by seniors and people with disabilities along with federal programmatic initiatives designed to improve access and mobility for transportation
Rosa *et al.* (2020a)	0	survey	▪ physical; ▪ hearing; ▪ visual	general	bus	questionnaire survey	***medium*** 851 tourists over 60 with and without disabilities	a questionnaire survey of tourists over 60 years of age (with and without disabilities) visiting the Algarve (Portugal) on their perception of the bus stop environment in their country
Rosa *et al.* (2020b)	2	survey	▪ physical; ▪ hearing; ▪ visual	general	general	questionnaire survey	***medium*** 851 tourists over 60 with and without disabilities	study carried out on the basis of 851 surveys of older tourists (with and without disabilities) travelling to the Algarve (Portugal) with the aim of finding out how they use public transport and the barriers they encounter
Ross *et al.* (2020)	10	review	generic	general	bus	review of information (literature)	n/a	review of accessible student transport services for children with disabilities
Sajib (2022)	0	survey	▪ physical; ▪ hearing; ▪ visual	Dhaka (Bangladesh)	general	focus group	***small*** 34 people with disabilities	study identifies the barriers experienced by people with disabilities when using public transport in Dhaka (Bangladesh)
Sitter & Mitchell (2020)	5	survey	generic	Eastern Canada	paratransit service	▪ photovoice; ▪ individual in-depth interviews	***small*** 5 people with disabilities	this study describes an adapted photovoice study that explored the facilitators and barriers to accessing paratransit services among people with disabilities
Starzyńska *et al.* (2015)	8	survey	▪ visual; physical; ▪ hearing	Poznan (Poland)	▪ bus; ▪ tram	▪ focus group; ▪ individual in-depth interviews with experts; ▪ questionnaire survey	***large*** 30 persons with disabilities, 2 experts in the individual interviews and 430 surveys of persons with disabilities	analyses the needs and identifies barriers for people with disabilities in the use of public transport. Formulates their needs before, during and after the journey on urban public transport
Stjernborg (2019)	12	survey	generic	Stockholm (Sweden)	▪ bus; ▪ metro; ▪ suburban train; ▪ ship	statistical analysis	n/a	survey of accessibility complaints (389) made by passengers in Stockholm to the concessionaire *Storstockholms Lokaltrafik* (metro, buses, suburban trains and ships)
Szewczyk (2020)	0	survey	physical	Szczyrk (Poland)	bus	questionnaire survey	***medium*** 161 elderly people who were physically disabled	the study aims to formalize measures to improve public transport activities by identifying the problems of the disabled and the elderly while traveling
Tennakoon *et al.* (2020)	12	survey	▪ physical; ▪ visual; ▪ hearing; ▪ psychical	Colombo (Sri Lanka)	▪ bus; ▪ train	focus group	***small*** 67 Older people and people with disabilities	this study explored the facilitators and barriers for safe and accessible transportation from the perspectives of older people and those living with disabilities in Sri Lanka

Reference	Cited by	Type of article	Type of disability	Scope	Means of transport	Tools	Participants	Description
Van Holstein *et al.* (2022)	5	survey	physical	Victoria (Australia)	▪ bus; ▪ train; ▪ tram	focus group	***small*** 16 public transport practitioners and disability rights organizations	this focus group study raises both opportunities and barriers to improving accessibility for people with intellectual disabilities across the public transport network in Victoria (Australia)
Vanderschuren & Nnene (2021)	6	review	generic	South Africa	general	review of information (literature)	n/a	investigates the availability of transport policies and guidelines in 29 African countries and an analysis of secondary data in South Africa, focusing on the inclusion of persons with disabilities
Velho (2019)	22	survey	physical	London (UK)	▪ bus; ▪ train	semi-structured interviews	***small*** 27 wheelchair users, 7 partners or carers, or non-disabled individuals involved in the world of transport (as policy-makers or in industry)	it analyses the impact that barriers to transport use have on the lives of wheelchair users; not only in terms of access issues, but also in the way it affects social inclusion
Velho *et al.* (2016)	18	survey	physical	London (UK)	bus	▪ video recordings on bus access for wheelchair users; ▪ individual in-depth interviews	***small*** 27 wheelchair users and 7 non-wheelchair users	research the barriers faced by wheelchair users on public transport using a mixed methods approach; recordings of bus access for wheelchair users and interviews on barriers to access to public transport
Waara *et al.* (2015)	11	survey	▪ physical; ▪ hearing; visual	Dalarna, Västmanland, Örebro (Sweden)	▪ bus; ▪ train	questionnaire survey	***large*** 2758 seniors (retired) and people with disabilities	presents findings on the need for traveller information among people with functional limitation(s), and how the need varies between groups with different functional limitation(s)
Wang & Cole (2014)	2	survey	physical	general	plane	focus group	***small*** 38 flight attendants	this study explores with focus groups the perceptions of flight attendants on the in-flight service needs of passengers with mobility impairments; it proposes recommendations to improve services
Wasfi *et al.* (2017)	16	survey	psychical	Hennepin County (US)	▪ bus; ▪ train	questionnaire survey	***medium*** 114 people with developmental disability	identifies transportation needs, and reasons for unmet, but desired untaken trips; about 46% were unable to make trips they needed to make

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