



Passengers with disabilities in the Brazilian air transport: different actors and similar perspectives

Passageiros com deficiência no transporte aéreo brasileiro: diferentes atores, perspectivas semelhantes

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Abstract: Changes in the world's perception of disability seek the promotion of social inclusion and participation of people with disabilities in all contexts and activities. However, there are numerous barriers in air transport that may make travel difficult for passengers with disabilities. Therefore, this study aimed to understand the experiences of passengers with disabilities in the Brazilian air transport from the perspective of different actors including professionals who work in associations that provide services to people with disabilities, reference rehabilitation centers, public agencies, and air travelers with disabilities. Twenty semi-structured interviews were conducted between 2012 and 2013 with these participants. The results indicated that passengers with disabilities face an array of challenges and difficulties during all stages of air travel, including factors associated with airports, aircrafts, and airline procedures and services. Therefore, it is suggested that further studies involving air travel users are carried out aiming at fully understanding their real needs and finding solutions to ensure independence and safety in the use of this means of transport.

Keywords: Passengers with disability; Air transport; Aircraft cabin; Ergonomics.

Resumo: As mudanças em relação ao entendimento da deficiência no mundo buscam a efetivação da inclusão social e a maior participação das pessoas com deficiência em todos os contextos e atividades. Entretanto, no transporte aéreo há inúmeras barreiras que podem dificultar a viagem dessas pessoas. Assim, este estudo busca compreender as experiências de passageiros com deficiência no transporte aéreo brasileiro, a partir das perspectivas de diferentes atores sociais, incluindo profissionais que atuam em associações, centros de referência em reabilitação, órgãos públicos e passageiros com deficiência usuários do transporte aéreo. Para desenvolvimento do estudo foram realizadas 20 entrevistas semiestruturadas entre 2012 e 2013. Os resultados indicaram que os passageiros com deficiência encontram inúmeras dificuldades no transporte aéreo ao longo de todo o processo de viagem, inclusive fatores associados aos aeroportos, às aeronaves e aos serviços e procedimentos das companhias aéreas. Sugere-se que projetos envolvendo os usuários sejam desenvolvidos, para que seja possível compreender as reais necessidades desses passageiros e desenvolver soluções que assegurem sua independência e segurança no uso do transporte.

Palavras-chave: Passageiros com deficiência; Transporte aéreo; Cabine de aeronave; Ergonomia.

1 Introduction

This study is part of the project entitled “Universal Cabin: understanding the special needs of air travel passengers”, which was carried out through a

partnership between the Laboratory of Ergonomics, Simulation, and Design of Production Situations (PSPLab/DEP/UFSCar) and Embraer (Brazilian

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Aeronautics Company). The objective of the present study is to investigate the travel experiences of passengers with disabilities and those with reduced mobility, including the elderly and obese. This project was approved by the Research Involving Humans Ethics Committee of the Federal University of São Carlos (UFSCar), according to the technical opinion 346.156, from August 1, 2013.

As proposed by the International Classification of Functioning, Disability, and Health (OMS, 2001), disability is defined as problems in the body function or structure such as a significant deviation or loss, a reduction, an increase, or an excess. However, disability is not the only factor influencing the participation or restrictions in activities since they result from the complex, dynamic, and multidimensional interaction of disability with contextual factors, including environmental or social factors.

According to the World Health Survey presented by the World Health Organization (OMS, 2011), 15.6% of the world population (around 650 million people) aged 18 or older have a disability that results in significant difficulties in functioning in daily life. When considering people aged 15 years and older, the estimate is a figure of around 720 million people with disabilities.

As reported by the 2010 Census, conducted by the Brazilian Institute of Geography and Statistics (IBGE, 2012), it is estimated that 23.9% of the Brazilian population have a disability, among these, visual impairment and physical disabilities have the highest rates of prevalence, 18% and 7%, respectively.

Yau et al. (2004) state that living with a disability poses unique challenges to the individual and can influence participation in many activities. According to these authors, tourism is one of the activities that many people with disabilities feel must be sacrificed as it requires cooperation of physical, mental, and social capabilities that are often compromised by a disability and become even more complex in the interaction with the physical and social environments. However, the desire to travel is the same for persons with or without a disability.

Accordingly, Yau et al. (2004) and Chang & Chen (2012) point out that the number of people with disabilities and reduced mobility due to population aging is expected to increase, especially for the baby boom generation and acquired disabilities. Furthermore, due to the potential for economic growth for this population group, they tend to travel more.

However, Chang & Chen (2012) argue that there are gaps between the needs of passengers with disabilities and the facilities and services offered by airports and airlines. Negative experiences in any stage of the journey, such as the need to wait in line at airports, the lack of accessible restaurants, bathrooms, and waiting areas, and the impossibility to use the lavatory in the cabin may discourage passengers from traveling again.

Burnett & Baker (2001) believe that segmenting the disabled by level of severity is a valuable process for understanding the difficulties using air travel. The authors added that level of severity is related to the travel frequency and means of transport chosen. The more severe the disability, the lower the travel frequency and the greater the tendency to use cars or vans as primary means of transportation. Issues related to environmental factors, accessibility, and activities are more relevant to passengers with severe disabilities. Moreover, the analysis of demographic variables indicates that there is a strong correlation between disability and the choice of travel destination criteria.

In a study on Israeli passengers, Poria et al. (2010) found that there are problems in the generalizations about passengers with disabilities. Their findings show that experiences of air transport vary according to the type of disabilities the passengers have. The authors reported that the difficulties encountered by passengers using wheelchairs were different from those with crutches and blind passengers.

During the flight, passengers using wheelchairs or on crutches have different preferences regarding seat allocation. The former prefer window seats, while the latter prefer aisle seats. Both prefer the front row seats due to the proximity to the lavatory and the aircraft entrance door (Poria et al., 2010).

For passengers using wheelchairs, the use of the lavatory is perceived as a humiliating experience since they have to be carried even when there is an on-board wheelchair available as it does not fit through the lavatory door. A major difficulty in the cabin for blind passengers is the flight attendant attitude, who often communicate with their traveling companions instead of communicating directly to them, tend to speak louder and slowly as if they could not hear or understand what is being spoken, and do not look to the passengers while talking to them (Poria et al., 2010).

According to Freeman & Selmi (2010), tourists with disabilities are a diverse group, and the impact of the same barriers can affect each person differently. However, this group shares some characteristics such as: they face daily challenges due to difficulties arising from the interaction of disability with the environment, which are greater during travels due to unfamiliarity with the new environments; they do not have opportunity to participate in the design and development of services and facilities related to tourism activities; and the participants of their study carried out in France and Canada reported having desire to travel, which is reduced by physical, attitudinal, financial, and communication barriers.

Daniels et al. (2005) argue that for people with physical disabilities every stage of the travel process requires significant planning time and careful attention to detail. The authors also point out that the barriers encountered by physically disabled passengers when traveling are primarily structural, followed by intrapersonal and interpersonal constraints.

In air transport, structural constraints are related, for example, to the absence of on-board wheelchairs on the aircraft, inadequate boarding and disembarking infrastructure, and lack of accessible toilets and lavatories. The intrapersonal constraints relate to the type and severity of disability, previous travel experiences and emotions. Interpersonal constraints involve negotiations and relationships with the traveling companion, the service provider, and the other passengers (Daniels et al., 2005).

Given the barriers and constraints reported by air travel passengers, Darcy (2012) highlights that due to negative experiences some passengers stated they may never fly again, while others stated they will choose modes of transport where their independence and dignity can be maintained.

Poria et al. (2010) suggest that given an unpleasant experience, passengers may decide not to travel again with the same airline. However, it is important to mention that many people need to travel, mainly for work purposes. Greggi et al. (2013) carried out a study on Brazilian passengers without disabilities and found that about 60% of the participants travel mainly for work-related purposes and to attend events and conferences.

According to Yau et al. (2004) experience plays a crucial role in determining future interests; thus, a positive travel experience builds confidence and motivates the person to travel more frequently. On the contrary, a negative experience may inhibit future traveling.

Some practices, procedures, and attitudes during air travel disrespect the independence, dignity, and equitable citizenship rights of passengers with disabilities. The constraints experienced by these passengers do not result from their disabilities; these constraints are structural, socially constructed, and perpetrated by airlines and airports (Darcy, 2012).

Darcy (2012) points out that during the pre-travel planning stage, the main issues identified by passengers are segregated booking procedures, for example, they cannot reserve a priority seat through the company's website and are required to make phone contact to explain their needs to the customer service attendant. Other issues include the inaccessible information format, the independent travel criteria, and limit to the number of assistive devices or service animals allowed per flight.

Some difficulties during boarding and disembarking include the separation of the passenger from their personal assistive devices, boarding and disembarking delay (first on- last off), the lack of boarding bridges (jetways) in regional airports, poor training of professionals that assist passengers, the transfer process to the on-board wheelchair and to the aircraft seat, service attitude, and the loss or damage of assistive devices (Darcy, 2012).

With regard to the aircraft, passengers encounter difficulties with seat allocation, the number of seats with flip-up armrests, safety procedures, difficult

access to the lavatory, lack of on-board wheelchairs (Darcy, 2012).

Small et al. (2012) analyzed tourist experiences of people who are visual impaired and observed that accessibility is a major issue in all stages of the journey and places visited, especially with regard to access to information, experiences of wayfinding, travelling with a guide dog, and knowledge and attitudes of others towards disability.

It is also worth mentioning the growth of low-cost airlines. The adoption of a so-called low-cost model by airlines has made air travel more accessible, price-wise. However, the services offered are more limited since the emphasis is on cost reduction, maximizing aircraft capacity, and compliance with safety and security requirements (Darcy & Ravinder, 2008).

Accordingly, Poria et al. (2010) found that passengers tend to avoid low-cost airlines because of their limited services. Darcy & Ravinder (2008) highlighted that this model imposes major constraints to passengers with disabilities, such as more restrictions in terms of baggage allowance and charges for excess baggage (such as assistive device), increased number of seats in the cabin, which results in limited space and makes it more difficult to accommodate and transfer, limited space in the aisle and inside the lavatory, use of regional airports, and boarding and disembarking from remote gates without boarding bridges.

The literature suggests that an increasing number of people with disabilities have expressed the desire and the need to travel, especially air travel. However, when travelling, these people face many barriers in all stages and contexts, which can lead to negative tourism experiences.

Among the studies identified, only a few address air transport, especially with regard to experiences faced by passengers with disabilities in aircraft cabins. Another limitation of the literature on this topic is that the studies available focus on experiences of passengers with physical and visual disabilities, disregarding other types of disabilities. In addition, no studies carried out in Brazil were identified.

Therefore, the purpose of this study was to understand the experiences of passengers with disability in the Brazilian air transport from the perspectives of different actors, including professionals who work in associations that provide services to people with disabilities, centers of reference in rehabilitation, public agencies, and air travelers with disabilities.

2 Method

The qualitative approach was adopted in the present study. This approach is usually used when there is little control over the variables, and the view of those being studied is emphasized (Creswell, 1997).

The participants were representatives of public agencies, centers of reference in rehabilitation, and associations that provide services to people with

disabilities. Participation was voluntary, and the study was approved by Research Involving Humans Ethics Committee of the Federal University of São Carlos (UFSCar), (technical opinion 346.156, August 1, 2013).

For data collection, 20 semi-structured interviews were conducted between December 2012 and February 2013 with representatives of the places visited; some of the respondents had disabilities and reported their personal experiences. Chart 1 shows the places visited. It is worth mentioning that these places were selected because they are renowned for the services provided for people with disabilities or reduced mobility, they operate in air transportation or in areas related to the rights of people with disabilities. The participants were contacted via email and telephone with an attached letter introducing the study.

Before conducting interviews, three interview guides were developed according to the places visited. These guides were composed of open-ended questions and included information about the respondent identification, the place characteristics, the situation of people with disabilities in Brazil, experiences and studies on air transport, trends, and comments and suggestions related to the present study. In the case of public agencies, there were also questions about the major resources, devices, or services provided to passengers with disabilities to facilitate the use of air transport. The passengers who participated in the study, for being users of air transport and having some type of disability, were also asked about their travel experiences.

Data processing began with the transcriptions of all interviews, and copies of the transcripts were sent to the respondents for their approval. Data were analyzed using content analysis (thematic modality), which is a set of analysis techniques for contextualized interpretations of documents produced by communication processes using systematic procedures having as ultimate goal the production of valid and trustworthy inferences of knowledge related to the production/reception of these messages (Bardin, 2011).

3 Results

3.1 Current situation related to the general context of disability and studies on air transport in Brazil

Based on the interviews with the regulatory agencies, it was observed that there is a lack of knowledge about the current situation of passengers with disabilities and reduced mobility in Brazil since the respondents of the agencies R12, R15, and R16 stated that they do not have information about it. Moreover, it was observed that the census conducted by the Brazilian Institute of Geography and Statistics is a reference used, and it was cited by respondents of the agencies R11 and R14. The respondent of the agency E10 reported receiving information related to the passengers requesting special

assistance from the airlines. The respondents of the agency R13 mentioned that specific aviation data can be obtained from the company that manages the airports in Brazil or from the National Secretariat of Civil Aviation, but we were unable to establish contact with the latter. Another finding is that some respondents (R12 and R14) showed interest in obtaining these data from research centers or hotel guest registration forms.

The interviews conducted with the associations showed that they also use the Census to obtain information on these data; the census was cited by the respondents of the associations R1, R2, R3, and R6. However, all of them casted doubt on the reliability of the Census data because the questions asked the public are about difficulties, which can cause distortion and discrepancy between these data and the World Health Organization data due to methodological differences. Although they did not cite the Census as a source of data, the respondents of the association R4 also mentioned doubting the reliability of Census data based on the fact that these data consider people who wear glasses or contact lenses as “visually impaired”. The respondents of the association E5 mentioned the difficulty of ophthalmologists in classifying visual impairment. On the other hand, the respondents of the association E8 mentioned the lack of accuracy of data on dwarfism since it started to be considered a disability only from 2004 onwards, according to the Decree n. 5296 (Brasil, 2004). Finally, although they did not mention disability demographics, the respondents of the association R9 stated that even if there are laws, most people with disabilities do not believe that their rights are respected, but they do believe that in order to improve accessibility, it is important to have a direct contact with them, without intermediaries.

With regard to research on people with disabilities and air transport, all respondents of the associations and centers of reference were unaware of studies available in the literature or that are being carried out. The respondents of the associations R1, R2, and R4 were the only ones who mentioned studies addressing urban transport. Most respondents of the public agencies mentioned only studies addressing urban and road transport, tourism, and the profile of tourists with disabilities, as well as discussions about accessibility and assistive technology concepts.

The respondent of the agency R10 said that although he does not carry out research, he participates in international debate events, maintains contact with other aviation agencies worldwide, and is aware of studies being planned or carried out on security and accessibility.

According to the respondent of the agency R11, there was a study commissioned by the Executive Office of Brazil, and it involved the state company that manages the Brazilian airports and an architecture and urbanism advisory committee, which were responsible for evaluating the accessibility of Brazilian airports to prepare for global events. This study evaluated the

Chart 1. Description of the participants and places visited.

PARTICIPANTS	RESPONDENTS	DESCRIPTION
ASSOCIATIONS AND CENTERS OF REFERENCE IN REHABILITATION	R1; R2	Associations that provide services to people with disabilities; located in the city of São Paulo.
	R3	Rehabilitation center at a hospital Complex; located in the city of São Paulo.
	R4; R5	Associations that provide services to people with visual disabilities; located in the city of São Paulo.
	R6	Association that provides services to people with deafblindness; located in the city of São Paulo.
	R7	Association that provides services to people with intellectual disability; located in the city of São Paulo.
	R8	Association that provides services to people with dwarfism; located in the city of Rio de Janeiro.
	R9	Institute that provides services and assistance concerning the rights of people with disabilities; located in the city of Rio de Janeiro.
PUBLIC AGENCIES	R10	National aviation regulatory agency.
	R11	National agency that coordinates and supervises activities carried out in the cities.
	R12	National agency that coordinates and supervises tourism activities.
	R13	National agency that coordinates and supervises activities in the transport sector.
	R14	National secretariat that defends and protects the rights of people with disabilities.
	R15	State secretariat that defends and protects the rights of people with disabilities.
	R16	Agency that represents the Brazilian paralympic movement.
USERS (Passengers with disabilities)	R17	36 year-old male with physical disability – paraplegia – caused by poliomyelitis; a track and field athlete and basketball player, who uses a wheelchair and drives an adapted automobile; flies frequently, 2-3 trips per month, for work purposes.
	R18	31 year-old female with physical disability – hemiplegia – resulting from cerebral palsy during pregnancy; an athlete whose events are javelin throw and shot-put; flies periodically, more than 5 times per year, for work purposes (competitions, sports events, and meetings).
USERS (Passengers with disabilities)	R19	54 year-old male with physical disability – paraplegia – who uses a wheelchair; a sociologist, who works at an institute that provides services and assistance concerning the rights of people with disabilities; flies quite often, more than 100 times per year, for work purposes.
	R20	48 year-old female with physical disability – dwarfism (achondroplasia), who is a lawyer and the president of an association that provides services to people with dwarfism; flies periodically, more than 5 times per year, for work purposes (lectures, conferences, and fairs).

architectural structures, services provided, aircraft movements, the presence of equipment to assist boarding and disembarking, such as ambulift or other suitable devices. It was completed and a report was sent to the airports; however, this material has not yet been available to the public.

3.2 Experiences of air travelers with disabilities

With regard to air transport, the respondents identified difficulties related to the airports, boarding and disembarking, aircrafts, and services and operations, as shown in Charts 2-5. It is worth mentioning that the respondents were included in the charts according

to the difficulties they mentioned, which were further categorized.

At the airports, the main difficulties identified are related to the lack of accessibility of the terminals and inadequate furniture design, especially service counters. The respondents also mentioned difficulties related to information and auditory and visual signage, and the absence of flight information display boards in lounges for passengers entitled to priority services.

As shown in Chart 3 below, the main difficulties encountered during boarding and disembarking refer to the lack of appropriate infrastructure, mainly the existence and use of boarding bridges or other equipment for vertical lifting, known as ambulift. This issue is related to airport infrastructure, especially regional airports,

and operational decisions of airlines which sometimes choose to use remote boarding and disembarking as a cost reduction strategy. Given this lack of adequate infrastructure, disabled passengers have to be carried up/down the steps during boarding and disembarking, which also occurs during seat-to-wheelchair transfers. According to the Resolution n. 280 (Brasil, 2013), adequate conditions or equipment used for boarding and disembarking have to be provided and maintained by the airport.

Another issue raised is the delay in leaving the aircraft due to disembarking procedures because

according to the Resolution n. 280 (Brasil, 2013), passengers with disabilities should be disembarked after all other passengers, unless there is a reason for a priority order for disembarking.

With regard to the aircrafts used in the Brazilian air transport, the difficulties identified by the respondents are related to the limited space in the aisle, lavatory, and seats. The limited space available makes it difficult to enter the aircraft using their personal wheelchair, seat-to-wheelchair transfers, move around on the aircraft, and to access the lavatory. The seats lack footrest, and some do not have removable or folding

Chart 2. Airports.

PARTICIPANTS		Main difficulties of people with disabilities in AIRPORTS
ASSOCIATIONS AND CENTERS OF REFERENCE IN REHABILITATION	R4	People with visual disabilities need high quality announcements in terms of sound quality, speech intelligibility, and information content.
	R5	Loud background sounds and noise in the terminals; disorganized system of communication with hissing, white noise, and muffled sound. The design of the facilities and furniture are not adequate for the use or reach of people with disability.
	R6	Lack of information in the restrooms.
	R8	Long distances from one location to another inside the airports.
	R9	Lack accessibility in the terminals.
PUBLIC AGENCIES	R11	Lack of accessible check-in counters.
	R14	In addition to the difficulties of passengers in wheelchairs, there are difficulties related to airport and aircraft signage and information.
	R15	Auditory signage is the same as other types of signage. Lack of humanized accessibility in the air transport.
USERS	R17	Lack of accessible check-in counters.
	R18	Lack of awareness of other passengers (some people question the existence of disability in priority lines).
	R19	Lack of flight information display boards in lounges for passengers requiring special assistance.
	R20	Lack of accessible check-in counters.

Chart 3. Boarding and disembarking.

PARTICIPANTS		Main difficulties of people with disabilities during BOARDING AND DISEMBARKING
PUBLIC AGENCIES	R10	Inadequate infrastructure for boarding and disembarking, such as lack of boarding bridges thus requiring the use of lifting equipment, for example, the ambulift. Number of ambulifts available does not meet the demand of airports.
	R11	Sometimes, the airlines that do not have ambulifts rent this equipment from other airlines at the airport, but this may not be enough in face of increased demands.
	R13	Lack of adequate equipment for boarding and disembarking.
	R15	Deficient infrastructure for boarding and disembarking.
	R16	Not all airlines have ambulifts. Some use a wheelchair with caterpillar tracks, which is not good because it is too wide making the transfer to the cabin seat difficult. Many times, the passenger has to be carried to be transferred to the cabin seat, which is not good. Hearing impaired passengers have inability to hear or understand boarding or gate change announcements made using a microphone, and therefore they often miss their flights. Visually-impaired passengers always need to travel with a companion or depend on assistance.
	R18	Delays, especially during disembarking.
USERS	R19	The need to be carried to arrive at their seat. Poorly maintained or faulty equipment make employees responsible for the procedures, who help because they want and not because they have to do it; this kind of service or assistance is not their job. Not being able to use their personal wheelchair during disembarking. Be the last to disembark.

Chart 4. Aircrafts.

PARTICIPANTS		Main difficulties of people with disabilities on AIRCRAFTS
ASSOCIATIONS AND CENTERS OF REFERENCE IN REHABILITATION	R1	Incompatibility of wheelchair dimensions with the space inside the cabin. Limited space for moving around on the aircraft or for seat-to-wheelchair transfers. Limited space inside the cabin lavatory. There is not enough space to storage wheelchairs in the cabin.
	R2	During the flight, physically disabled people need a special area, their own space, an adapted wheelchair, and space for their travelling companion.
	R4	People with visual impairment need high quality on-board announcements in terms of sound quality, speech intelligibility, and information content. They have difficulty to call a flight attendant and arrive at their seat.
	R6	Lack of information in the lavatory. There is need to enhance the quality of TV screen of the in-flight entertainment systems. Lack of Braille signage in the cabin, as well as large print signs for ease of reading.
	R8	The main difficulties are moving around and reaching things.
	R9	Dealing with prejudice and lack of accessibility and attentive people.
PUBLIC AGENCIES	R14	Besides the obvious difficulties encountered by wheelchair passengers, there are difficulties related to the availability of information and signage at airports and inside aircrafts.
	R15	Moving around in the cabin is very complicated, including the access to the lavatory, which does not have standard dimensions. Auditory signage is the same as other types of signage.
	R16	Limited space makes it difficult to move around in the cabin with a wheelchair. The first and last seats are reserved for passengers with disabilities. It is almost impossible to transfer to and from a wheelchair in the last seats and to move down the aisle to the back of the aircraft. The seatbelt does not ensure safety during take-off and landing. The 3-point seatbelt would be safer. Access to the lavatory is complicated. International flights have on-board wheelchairs, enabling passengers to use the lavatory since there is more space. In domestic flights, the access to the lavatory is impossible since it is tight and non-accessible. Some people prefer the window seat due to more privacy, but this is not always possible. In the first rows, the problem is the fixed armrest. In the last rows, the problem is the difficulty to get there. There are no designated priority storage areas for the assistive devices; thus, they have to be stowed in the overhead storage compartment, making their access difficult, and they can be broken.
USERS	R17	Seats, doors, and aisles in the cabin: everything is narrow and has very limited space. Going the cabin lavatory. Limited space inside the lavatory. Lack of miscellaneous storage for personal belongings in the lavatory. Lack of footrests in the cabin seats.
	R19	Fixed footrests and armrests. Small seats and limited legroom. Narrow aisles, which do not allow full wheelchair accessibility. The on-board wheelchairs are extremely uncomfortable, tight, small, and have a hard seat cushion; they seem like a “wood stool”. Impossibility to use the cabin lavatory.
	R20	Lack of footrests in the cabin seats.

armrests, making it even more difficult to transfer the passenger from the wheelchair to the seat, especially to a window seat. The respondent R16 highlighted that the seat belt does not ensure safety during the take-off and landing stages of the flight, especially for those with no upper body control.

According to Resolution n. 280 (Brasil, 2013), it is mandatory that aircrafts with more than 100 seats have an on-board wheelchair, but its minimum required dimensions have not been established. The respondent R19 stated these wheelchairs are tight, small, and uncomfortable. Even when there is a wheelchair available, they do not fit inside the cabin lavatory; thus the passenger can use the lavatory only with the assistance of a travelling companion or a flight attendant.

Issues related to information and signage on aircrafts were also mentioned by the respondents R6, R14, and R15, who stressed the importance of audio quality, speech intelligibility, and information content, as well as visual and tactile (Braille) signage to meet the needs of visually or hearing-impaired passengers.

With respect to services and operations, as shown in Chart 5, the respondents R15, R16, R17, and R19 expressed concern about personal assistive equipment such as wheelchairs. Since there is no designated priority storage areas for these devices in the cabin, they are checked in the load compartment and are subject to damage or loss of parts. Furthermore, the check-in options and procedures vary per airline, and the passengers are not always allowed to keep their own devices until boarding (which would give them

Chart 5. Service and operations.

PARTICIPANTS		Main difficulties of people with disabilities in terms of SERVICE AND OPERATIONS
ASSOCIATIONS AND CENTERS OF REFERENCE IN REHABILITATION	R2	The main perceived barriers are attitudinal discrimination, difficulty in dealing with people, and the lack of training.
	R3	The main difficulty is the lack of information, for example, in relation to fare discounts to a disabled passenger traveling companion.
	R5	Unprepared airport staff is the main difficulty. It is important to have people helping in this type of place to provide proper assistance to passengers with disabilities.
	R6	Deafblind people need someone to guide them, and they usually seek volunteers.
	R7	Attitudinal barriers are three times more likely to be encountered than the architectural barriers. Hence the importance of proper training.
	R9	Dealing with prejudice, lack of accessibility, and lack of attentive people.
PUBLIC AGENCIES	R10	Passengers with disabilities need to be seated close to the aircraft door and within close proximity to a lavatory. Unprepared staff unable to identify the individual needs and provide adequate assistance to passengers.
	R11	The main deficiency is in the service sector: there are no sign-language interpreters Lack of staff training. Lack of supervision; the employees responsible for supervising are not always available and have to be found.
	R13	Poor services due to inadequate training.
	R15	Passengers fear that their wheelchair might get damaged. Untrained staff involved in wheelchair assistance. Ticket purchase process is inaccessible, and people are unaware of the services offered. Priority seats are sold for non-disabled passengers because they have more legroom.
	R16	Priority front row seats are sold at a higher price for offering more comfort, which can be embarrassing during boarding because often passengers refuse to leave their seat because they it was purchased in advance, it was more expensive, or simple because of personal superstitions. When there is a large group of disabled athletes on the same flight, no company is prepared to provide proper services. Some companies do not offer priority boarding. Damage to assistive devices, including wheelchairs. Airlines pay compensation for damaged devices, but it is a lengthy process. Some flight attendants help blind passengers navigating through the cabin, which is of great help; others just give them Braille flight instructions.
USERS	R17	Damage to personal assistive devices.
	R19	Unprepared airport and airline staff. Embarrassment while going through security. Separation from their personal assistive device, such as a wheelchair, which causes uncertainty as to whether their wheelchair might get lost or damaged. First-row seats are not always reserved for passengers entitled to priority services. Not being able to use their personal wheelchair during disembarking.

independence), and therefore they have to be checked with the luggage.

The respondents R2, R5, R7, R10, R11, R16, and R19 stated that inadequate training make airport and airline employees unprepared to assist passengers with disabilities. The respondents R2 and R9 mentioned that passengers with disabilities encounter prejudice, discrimination and negative attitudes from employees who were supposed to provide assistance for them, as well as from other passengers. With regard to the employees, the respondent R6 indicated the need for a travelling companion for passengers with deafblindness, and the respondent R11 pointed out the lack of sign-language interpreters.

Another difficulty identified is related to seat allocation procedures, mainly in terms of allocating "priority"

front row seats, which offer comfort and extra legroom, for passengers who do not meet the criteria established by law. In such situations, disabled passengers feel uncomfortable when they have to negotiate seat swap on the plane with other passengers because, due to their disabilities, reaching other seats further down the aisle is not an easy task. This difficulty is evidenced when moving down the narrow passageway, either by using an on-board wheelchair or by being carried, and there is an even greater difficulty in transferring to the seat, where there is more limited space.

In order to deal with the difficulties identified, the disabled passengers who participated in this study have adopted some strategies for air travels. The respondent R17 mentioned using the fixed seat armrest as a support to transfer to his seat. In addition he brings

extra cushions for greater comfort in the aircraft seat. The respondent R19 said he does not check luggage because he is already concerned about having to pull the wheelchair off the conveyor belt. He also mentioned using a leg bag (for urine) due to the inability to use the lavatory during the flight and that he uses the bathroom before the flight or in between flights, in the case of connections. This participant also mentioned having already used a freight elevator to board small aircrafts using his own wheelchair.

The respondent R20 said that she tries to stand up and walk around the cabin during the flight to avoid cramps because of the lack of footrest. In addition, she prefers the first row to have more space and that she stretches her legs out onto the seat next to hers when it is empty. Due to her difficulty to reach the overhead compartment, she prefers checking all her bags and retrieving them from the conveyor belt.

Despite the many difficulties encountered throughout the journey, the participants with disabilities mentioned some positive aspects of air travel: i) special assistance and service of airline and airport employees, according to the respondents R17, R18, R19, and R20; ii) adequate infrastructure for boarding and disembarking, such as boarding bridge and ambulift, according to the respondent R19; iii) priority boarding, according to the respondent R18; and iv) being able to use the

personal wheelchair during disembarking, as happened sometimes with the respondent R19.

3.3 Trends and suggestions

In terms of trends, as shown in Chart 6 below, the respondents of the associations believe that there has been increased participation of people with disabilities in the labor market and an improvement in their inclusion into society due to the emergence of new laws and regulations and increased awareness.

The respondents of the regulatory agencies agree and also mentioned the improved social inclusion as an evident trend and highlighted the need for further research in the area. The regulatory agencies reported that there are many initiatives under development, which indicates that there have been some actions in terms of laws and regulations concerning this issue.

As for the suggestions for the present study, as shown in Chart 7, the respondents of the associations indicated the need for further research to include airports, services, and even the existing norms and resolutions. In addition, they mentioned the need to listen to the final users to achieve accessibility improvements.

Chart 6. Trends related to people with disabilities and air travel.

PARTICIPANTS		Trends related to people with disabilities and air travel
ASSOCIATIONS AND CENTERS OF REFERENCE IN REHABILITATION	R2	Change the social status of people with disabilities resulting from the Disability Employment Quotas and increased participation of these people in the labor market, improving their consumption behavior and ability to travel.
	R4	There is a group of researchers working together to establish specific technical standards. Discussions have been held, and laws and policies have been developed to increase global awareness that social inclusion should also encompass other groups besides people with disabilities.
	R5	There has been a growing concern about people with disabilities.
	R6	There have been slow but steady improvements in the transport in general due to new laws and regulations.
PUBLIC AGENCIES	R10	Research, including academic research, has an important role to support regulations. International civil aviation agencies have research centers and have created many partnerships with universities to carry out studies to support the regulations in order to establish higher safety standards without hindering airline operations. This agency benefits from these international studies, but has limited active participation in these studies; this situation needs improvement.
	R11	Accessibility issues have become increasingly evident in our society. Several accessibility actions are being developed by control agencies, and many large investments have been made in this area. However, there is still no federal accessibility policy although there is a set of standards. Accordingly, this agency wants to encourage a cultural change in public management.
	R12	The number of elderly people and disabled people is increasing, and accessible tourism programs can boost the timid demand for air travel among people with disabilities.
	R14	There is a strong trend towards improvement in social inclusion, including the education areas, which may lead to increased income thus contributing to the increased participation of people with disabilities in tourism and leisure activities.
	R16	The Federal Government has encouraged the opening of more domestic airports. However, considering greater passenger transport volumes does not mean considering people with disabilities.

Chart 7. Suggestions.

PARTICIPANTS		Suggestions for the present study and for air transport
ASSOCIATIONS AND CENTERS OF REFERENCE IN REHABILITATION	R1	Further research including airports in addition to aircrafts.
	R2	The research should also address regulations and policies, characterize the needs per type of disability, and develop a classification system.
	E3	Develop a “pilot aircraft” to introduce new accessibility ideas.
	R4	Create a new job position in the airline for monitoring the assistance provided for people with disabilities, provide audio description of aircraft information and signage, and create a designated priority space in the cabin for passengers who need assistance.
	R5	During air travel, there should be baggage assistance, more space for moving around, and guide dogs should be allowed to travel with the passenger in the cabin. There should be assistance to take disabled passengers to the lavatory, which should meet the accessibility standards for item location. Provide training for airline employees on how to deal with passengers with disabilities.
	R7	People should know the constitution laws. They do not need to be changed but must be applied.
ASSOCIATIONS AND CENTERS OF REFERENCE IN REHABILITATION	R8	People should attend Assistive Technology and Inclusion fairs.
	R9	People should continue establishing direct contact with people with disabilities, without intermediaries. Apply questionnaires to employees who deal with passengers on the flight to understand the day-to-day dynamics of air travel. Try to make contact with the athlete delegations; their staff can provide assistance with certain needs that the crew is not aware of.
PUBLIC AGENCIES	R17	More comfortable seats: better recline angle, wider, and adjustable footrest. Employee training to improve passenger assistance, for example, seat-to-wheelchair transfers.
	R18	The safety demonstration should be performed individually, for example, for visually impaired passengers.
	R20	Aircraft seats with adjustable recline and leg and footrest.

The regulatory agencies did not offer suggestions for improvements, and the users suggested improvements in the seats and better employee training.

4 Final considerations

The results obtained indicate that there are some difficulties related to the demographic data of people with disabilities in Brazil, mainly disabled air travelers. The reasons are lack of data or the data are not easily available or are unreliable.

All respondents are unaware of studies on air travel experiences of passengers with disabilities. Nevertheless, trends and international studies indicate an improvement in the social inclusion of people with disabilities and an increase in their participation in all social contexts, including tourism and leisure activities.

Moreover, it is worth mentioning that the studies identified address passengers travelling for leisure tourism purpose. However, according to the users interviewed, the main purpose for traveling is work, which indicates the need to travel often with a fixed schedule few options.

With regard to the Brazilian air transport, despite the differences found among the respondents, which are

due to the fact that they are either users of air transport or work in this specific sector, it was observed that all participants recognize the existence of many barriers to passengers with disabilities during all stages of the journey. Therefore, their difficulties start while booking tickets and are also encountered at airports during boarding and disembarking, during the flight, and in the airline services and procedures. Accordingly, transport accessibility is responsibility of all people involved, such as airport operators, airlines, aircraft manufacturers, and regulatory agencies.

The difficulties identified are related to accessibility to the physical environment and social factors. As for the physical environment, there is the lack of accessibility of airports, inadequate furniture design in the terminals, limited space in the cabin, which makes the use of the lavatory impossible, and cabin seats without removable or folding armrests, which the hinders disabled passengers’ independence and compromises the safety of seat-to-wheelchair transfers. The format, quality, and content of information and signage at airports and on aircrafts were also identified as problems by the respondents.

With regard to the social factors, the respondents mentioned difficulties related to the airline services

and procedures, especially in terms of allocation of priority seats, inadequate training of the professionals who provide assistance to passengers with disabilities, and damage or loss of assistive devices.

On the other hand, the users pointed out that staff assistance is one of the positive aspects of air transport since the physical environment barriers can be overcome with the monitoring and assistance of employees and flight attendants. However, these participants suggested that these professionals need a more adequate training to better assist disabled air passengers.

It is noteworthy that the boarding and disembarkation difficulties are related to both physical factors, such as the lack of boarding bridges or lifting devices (ambulift), and social factors. This is due to the fact the procedures adopted result from resolutions of this sector and operational choices that are directly related to the airline operation model and the airport infrastructure.

The suggestions to improve air transport include the need for further research encompassing experiences faced in the entire journey and discussions about transportation accessibility regulations. The respondents also suggested that the involvement of passengers in the search for improvements is of crucial importance. In addition, it was suggested improvements in the seats, which could enhance passenger experiences since aircraft seats are the subject matter of frequent complaints.

In the context of this discussion, it can be concluded that further studies should be carried out in order to better understand the travel experiences of passengers with disabilities aiming at developing improvement solutions to ensure independence and safety to all air travelers throughout the journey. This requires a joint effort between manufacturers, operators, regulatory agencies, users, and researchers.

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