Perception of Persons with Disabilities Groups on Accessibility and Connectivity of Public Transportation Infrastructure in Kuala Lumpur, Malaysia

Risha Ramli[1], Rosilawati Zainol [2, *], Naziaty Yaacob [3]

[1] Department of Architecture, Faculty of Built Environment, Universiti Malaya, 50603 Kuala Lumpur, Malaysia
[2] Department of Urban and Regional Planning, Centre for Sustainable Urban Planning and Real Estate (SUPRE), Faculty of Built Environment, Universiti Malaya, 50603 Kuala Lumpur, Malaysia
[2] Centre for Transport Research, Universiti Malaya, 50603 Kuala Lumpur, Malaysia
[2] Centre for Civilizational Dialogue, Universiti Malaya, 50603 Kuala Lumpur, Malaysia
[3] Hijau Mikro Sdn Bhd, 58100 Kuala Lumpur, Malaysia

*Email: *rosilawatizai@um.edu.my*

Abstract

Physical and attitudinal barriers have been identified as systemic failings in public transportation, resulting in a plethora of impediments that obstruct the travel of city residents. The purpose of this study is to evaluate the perceptions of designated groups of people with disabilities (PWD) regarding the accessibility of public transportation in Kuala Lumpur, Malaysia, in order to improve the city's public transportation system as a whole. This research strategy involves obtaining qualitative data from five distinct PWD groups, totalling twenty (20) respondents, using focus group discussion techniques four (4) individuals with physical disabilities, five (5) who are blind or partially sighted, three with learning disabilities, three older persons, and five who are deaf). The findings from the focus group discussions were organised into themes, categories, and codes. The results revealed that the PWD respondents had negative perceptions of the facilities, services, and safety of the public transportation system, particularly among those in the physical, blind, and learning disability categories. Standard operating procedures (24.12%), the design of public transportation vehicles (15.99%), and the design of transportation buildings (13.95%) were identified as the primary concerns. Additionally, the following recommendations were made; enhancing facilities and the built environment and educating the general public on the importance of creating a barrier-free environment. Understanding the perceptions of PWD toward the public transportation system in Kuala Lumpur, Malaysia paves the way for an inclusive and seamless transport system in the equitable society of Kuala Lumpur, Malaysia, thereby fostering trust and confidence in the system, especially among PWD groups.

Keywords: Inclusive Mobility, First Mile Last Mile, Persons with Disabilities, Perception, Walkability

1.0 INTRODUCTION

Malaysia is well known for its socio-economic and cultural diversity, aiming to become an advanced and inclusive society, including PWD groups. By 2030, the Malaysian government promises to provide 40% of its urban residents with access to public transportation (Suruhanjaya Pengangkutan Awam Darat, 2016). To meet societal demands, Kuala Lumpur's public transportation system has undergone constant improvement over the past few decades. However, Kuala Lumpur's rapid development necessitates a more modern public transportation system. For instance, as more people travel to and from the city center, there is an increase in traffic congestion, especially during peak hours. According to survey results from 2010, only 17% of daily trips were made using public transportation, and high reliance on private transportation contributes to this demand (Onn, Karim, & Yusoff, 2014).

To ensure that no one is left behind, the United Nations' Sustainable Development Goals (SDGs) aim to inspire action by 2030 (United Nations, 2015). The SDGs prioritise the inclusion of enabling environments in

strategies that encompass inclusive, safe, resilient, and sustainable business, innovation, and infrastructure (SDG 9), decreased inequality (SDG 10), and safe, resilient, and sustainable neighborhoods and cities (SDG 11).

In 2018, there were 497,390 registered PWDs in Malaysia, accounting for 1.6% of the total population (Department of Social Welfare, 2018). However, this number does not reflect the World Health Organisation's projection of 1 billion or 15% of the population, based on the world population estimate for 2010. According to this projection, there should be around 4.8 million PWDs in Malaysia, which has a current estimated population of around 32 million. Additionally, disability patterns have been significantly impacted by global aging, and Malaysia currently has an estimated 3.6 million people over the age of 60, representing 11.2% of the population. On average, males in Malaysia live for 72.8 years while females live for 78.2 years (Department of Statistics Malaysia, 2020). The relationship between aging and disability is evident: older people are more likely to be impaired, and populations of countries are aging at unprecedented rates (World Health Organization, 2011). An aging population is also more likely to struggle to maintain basic living standards, including health, which may be a factor in Malaysia's rising PWD population. Consequently, Malaysia should prioritize the connectivity, comfort, attitude, legibility, safety, and overall health of its public transportation system to ensure the well-being of PWDs.

Accessible environmental facilities for public transportation systems are not only crucial for people with disabilities but also beneficial for a broader range of individuals. There is a risk that accessibility for PWD will be overlooked, and expensive new assistive technologies will be chosen over universal design to accommodate the diverse capacities and abilities of society in the future. Inadequate planning and implementation would have alarming repercussions and create barriers to public transportation for PWD and older adults, limiting their ability to commute safely and engage in social activities, and obtain necessary services. Furthermore, social isolation, a decline in quality of life, and being housebound as they age are among the consequences faced by PWD.

Mobility within neighborhoods, is crucial to ensure seamless commuting for transit users. Walking is a component of a trip that may also involve public transportation. Some disabled individuals require more assistance than others. Therefore, walking facilities is a crucial component of a safe and comfortable transit service that transports passengers from their homes to their destinations.

1.1. Accessibility and Connectivity of Public Transportation for PWD

Walkability is an essential aspect of urban transportation systems that has garnered increased attention from researchers and policymakers in recent years. Two main factors influencing walkability for transportation are health and functional limitations, and environmental barriers. These factors have been studied by Clark and Scott (2016) and Van Cauwenberg et al. (2012).

Research conducted by Perry (1929) and Barton, Grant, and Guise (2003) has shown that walking 400 meters typically takes around five minutes. However, other studies, such as that conducted by Azmi, Karim, and Amin (2013) in Malaysia, indicate that factors such as age and obstacles can affect walking speed. Naharudin, Ahamad, and Sadullah (2017) found that the frequency of built environment elements along a walking route could influence pedestrian attractiveness scores based on public preferences. Rural residents in Malaysia are willing to walk 600 meters compared to 400 meters in urban areas (Azmi et al., 2013).

Despite the importance of walkability for people with disabilities (PWD), there is a limited understanding of their travel behaviour in neighborhoods in Malaysia. Additionally, information on built environment components that serve as facilitators and barriers for PWD groups is scarce (Cerin et al., 2017; Kett, Cole, & Turner, 2020). Therefore, regular data review, monitoring, and implementation are necessary to improve inclusive public transport systems and walkability in tandem with Malaysia's rapid socio- economic development.

Conventionally, a good walking environment consists of three elements: Design, Density, and Diversity. The street design includes a walking path with good access to the station from the origin and a continuous path. Street density factors include the number of facilities and furniture along the path and traffic aids, such as traffic lights and crossings, to enhance walking safety. Street diversity involves connecting various land uses to transit services by walking paths, including access to workplaces or leisure activities for the local society.

Personal safety, traffic safety, and neighborhood surroundings are the determinants of walkability in a Putrajaya, Malaysia, neighborhood area (Karim & Azmi, 2013). Previous studies suggest that the determinants of transportation for PWD include transportation service determinants, built environment characteristics, and individual attributes (Cerin et al., 2017; Ragland et al., 2019; Shrestha et al., 2017).

Kett, Cole, and Turner (2020) highlight the challenge of measuring and monitoring transport access and inclusion for people and children with disabilities in a range of contexts and impairments, considering concerns of safety, security, independence, and autonomy. In Malaysia, information and data on travel behavior and patterns of PWD related to facilitators and barriers are not well documented.

In order to address this knowledge gap, this study concentrates on specific PWD groups and their perceptions of the Kuala Lumpur public transportation system. The purpose of the study was to assess and analyse the perspectives of individuals with disabilities regarding the accessibility and connectivity of public transportation systems. This study's findings will provide valuable information for the development of Kuala Lumpur, Malaysia's public transportation system for an inclusive society.

2.0 CONCEPTUAL FRAMEWORK

To gain a deeper understanding of walking as a means of transportation for people with disabilities (PWD), we have adopted the "bio-psycho-social" model, also known as the International Classification of Functioning and Health (ICF). This model provides a balanced approach that bridges the gap between medical and social perspectives. It categorizes issues related to human functioning into three interconnected domains: impairments, activity limitations, and participation restrictions, highlighting disability as problems within these domains. The ICF is inclusive and recognizes disability as a continuum, rather than isolating individuals with disabilities into a separate group.

In Malaysia, PWD can be classified into seven categories: hearing disability (DE), visual disability (BL), speech disability (SD), physical disability (PH), learning disability (LD), mental disability (ME), and multiple disabilities (MD), according to the Department of Social Welfare (2021). Meanwhile, in Singapore, PWD is defined as individuals who face reduced opportunities in education, training, employment, and recreation due to physical, intellectual, sensory, and developmental impairments, as stated by the Ministry of Social and Family Development (2018).

Traditionally, the social model of disability posits that people are disabled by societal and physical environments, which act as barriers to their well-being. This model views health and disability in relation to the environment, emphasizing that individuals are hindered by societal barriers rather than their impairments, thereby challenging the conventional biomedical model. The United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) defines disability as the interaction between individuals with impairments and the behavioral and environmental obstacles that impede their full and effective participation in society on an equal basis with others (United Nations, 2006).

Disability arises when health problems interact with contextual variables, such as environmental and personal factors. The accessibility of a given environment plays a crucial role. Inaccessible settings create barriers to participation and inclusion in society, exacerbating impairments. The ICF acknowledges that environmental factors can either facilitate or impede participation and lists various factors, such as products and technology, the natural and built environment, support and relationships, attitudes, and services, systems, and policies (World Health Organisation, 2011). On the other hand, personal factors, including an individual's capacity, motivation, and self-esteem, can influence their level of engagement in society, particularly in the context of an accessible public transportation system.

3.0 METHODS

The goal of this study was to evaluate the perception of PWD groups on Kuala Lumpur PTS. The PWD groups were identified and categorised in this research as follows: physical disability (PH), blind (BL), learning disability (LD), deaf (DF) and older adult (OL). A Focus Group Discussion was held on 12 May 2015 between researchers from Universiti Malaya and the research participants, as shown in Table 1.

Table 1. Demographic of research participants for focus group discussion.

	Key Informants	**Gender**	**Details**	**Aid**
Physical Disability	PH1	Male	Works in sports	Motorised wheelchair
	PH2	Male	National Council for Persons with Disabilities	Manual wheelchair
	PH3	Male	Access auditor	Manual wheelchair
	PH4	Male	Freelance artist	Manual wheelchair
Blind/ Partially Sighted	BL1	Male	National Council for the Blind	Assistive cane
	BL2	Male	Researcher and academic	Assistive cane
	BL3	Male	Malaysia Association for the Blind	Assistive cane
	BL4	Female	Council member; Society of the Blind Malaysia	Assistive cane
	BL5	Female	TTDI Resident, partial sighted	-
Learning Disability	LD1	Female	Mother of 25 years old son with moderate learning disability	-
	LD2	Male	Works at United Voice, diagnosed with ADHD	-
	LD3	Female	Works at United Voice, diagnosed with learning disability	-
Older Persons	OL1	Female	TTDI Resident, slight mobility impairment	Sometimes assistive cane
	OL2	Male	Slight mobility impairment	-
	OL3	Male	Slight mobility impairment	-
Deaf	DF1	Female	Hearing impaired	-
	DF2	Male	Hearing impaired	-
	DF3	Male	Hearing impaired	-
	DF4	Female	Hearing impaired	-
	DF5	Female	Hearing impaired	-

Five groups of PWD each was assisted by one moderator, one head rapporteur, two assistant rapporteurs and one observer. Moderators include one researcher and academic specialising in sports and disability, one researcher specialising in urban design and architecture, one researcher and academic in urban and regional planning one local authority and advocate for PWD rights in built environment and one architectand advocate for PWD rights in built environment.

The research participants were grouped into five groups consisting between three to five participants as follows:

a) Four persons with physical disabilities and wheelchair user
b) Five blind or partially sighted persons
c) Two persons with learning disabilities and one caregiver of persons with learning disability
d) Five deaf persons
e) Three older persons.

3.1. Focus group discussion procedure

The FGD was conducted simultaneously on the same day and within the allocated time. The FGD was conducted by Universiti Malaya researchers in partnership with BAKTI-MIND, an organisation that provides information and resources for PWD. Details of the event are in Table 2 as follows.

Table 2. Details of focus group discussion event.

Event	MIND EDUCATION SERIES XXV Sub Grand Challenge 1: Promotion of Inclusive Society through SeamlessTransportation and Mobility for the Inter-generational Society
Date	12 May 2015 (Tuesday)
Time	1.30 p.m. – 5.00 p.m.
Venue	Seminar Room 1 & 2, BAKTI-MIND, Bangunan Bakti Siti Hasmah, Taman Tun Dr Ismail, Kuala Lumpur, Malaysia

a) Preparation before the focus group discussion

Invitation to the FGD event was coordinated through emails, text messages and telephone calls. Theinitial target of five participants for each group was subject to the availability of participants on the pre-determined date, time and venue. The invitation was extended to the moderators, rapporteurs, observers, secretariat and photographers to assist with documenting the event. Other preparation included transportationassistance which was offered to participants and confirmed before the event. Planning and arrangement of equipment, audio recorders, refreshments and seating plans were discussed and determined. In addition, question guides, registration forms and writing stationaries were prepared in advance.

b) During the focus group discussion

Registration opened between 1.30 p.m. to 2.00 p.m. and participants' written consent and details were obtained before they were ushered to Seminar Room 1 for briefing. Participants, moderators and observers were introduced to the background of the research, briefed on the questions and estimated duration of the FGD. FGD commenced at 2.30 p.m. after Group 1, Group 3 and Group 5 were directed to Seminar Room 2 to provide a more comfortable spacing between groups, thus reducing participants' discomfort during the discourse.

Audio recorders were regularly checked to ensure continuous recording and placed close to the participants for clarity. The researcher had to be mindful of time, thus several time-checks or reminders for moderators to ensure all questions were covered. Participants were allocated time to add additional information before the session ended. Sharing of key findings was presented to conclude the 1 hour 30- minute discussion.

c) Post-focus group discussion

The transcript was keyed in immediately after the FGD at the event venue by the rapporteurs. Any notes, immediate thoughts and clarification on responses were recorded under the researcher's notes. Finally, the researcher double checks the transcript against the recorded audio files to ensure no missing information.

3.2. Qualitative data analysis

Data were analysed using inductive and deductive approaches. Coding and data analysis using Thematic analysis technique and organizing data were done using NViVo 12 Software. Subsequently, the thematic analysis process (Nowell et al, 2017) includes triangulation of data using field notes and observation; identification of initial codes using line by line coding; compilation of categories based on the relationship between codes and frequency; formation of themes based on categories and conceptual framework of the study and review of themes and subthemes. Frequency coding across 5 PWD groups was conducted to identify frequently identified categories. Thematic analysis, according to Braun and Clarke (2006), is a versatile and practical technique for examining a variety of qualitative data, such as interviews, focus groups, and open-ended survey results.

4.0 RESULTS

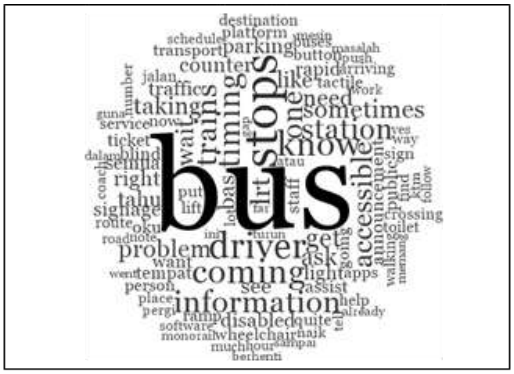

Figure 1. Word frequency summary of the focus group discussion for all PWD groups.

From Figure 1, it has been shown visually that the top-ten words frequently mentioned by the PWD informants were bus, stops, driver, coming, information, problem, station, know, timing and accessible. This verified the significance of the built environment, transportation vehicle and services emphasised by the PWD groups. Based on Table 1 (in Section 3) that signifies the diversity of the PWD informants, below are the findings of this study with reference to Accessibility, Management and Operation, Public Awareness and Policy and Legislation.

Below are the descriptions of themes, categories and codes as well as supporting quotations from the data obtained from the FGD. The details of the translation of themes based on the issues are described below from Sections 4.1, 4.2, 4.3 and 4.4.

4.1. Accessibility

Accessibility is an essential component of creating a society that is inclusive and equitable for all individuals. However, there are several challenges that need to be addressed to ensure that people with disabilities (PWD) have equal access to transportation facilities.

a) Design of public transportation building

i. Unclear accessibility and wayfinding information for different PWD groups

There was a lack of clear complete transit station accessibility information for all the PWD groups. For instance, respondent PH2 discussed his concerns over the gap between the train coach and the platform at the intended destination was not available.

"They should inform the staff at the destination, and they get it (portable ramp) ready there. Then you will find more people using public transportation, because we cannot use because we don't know the situation (gap from the coach to the platform) at the destination." [Interviewee PH2]

Another example was pointed out by respondent DF5, whereby lack of visible information signage on train arrival or delays causing DF group to face confusion and difficulties during their journey.

"It is just that when you waited for the train for a period of time but the train doesn't come. And we thinking of why? Because my son and I are deaf, we don't know what is happening. If the is information is visible, then only we can know what is the problem." [Interviewee DF5]

For BL group, arrival and departure information in the form of audio announcements was not either not available or not clear at bus and train stations causing disruption in their journey as mentioned by respondents BL3 and LD2 below:

"Unfortunately, when the bus arrives, we do not know whether that the bus that we are waiting for" [Interviewee BL3]

In addition, BL group also discussed the lack of braille signages at the train station facilities as mentioned by respondent BL1 below:

"Signage kena buat (need) Braille signage." [Interviewee BL1]

Visibility, size and location of directional signage and facilities labels at transit stations were not effectively designed for all PWD groups, particularly for LD and OL groups as mentioned below:

"The coach lettering is not big enough for people to see. It is not visible. And the signage for toilet also not visible." [Interviewee LD2]

ii. Unsafe threshold between train and platform

An unsafe gap between the train coach and the station platform could cause injuries to the PWD, especially PH and LD groups. Respondent PH1 discussed this issue as given below:

"Sometimes unstable (hard) to go down to platform from the train, especially from the front trains due tolevel on the platform. However, cannot use the use the middle coach due to female coach." [InterviewPH1]

"Monorail (coach) and station gap is very big, monorail (coach) is always higher than the station." [Interviewee PH4]

Similarly, BL group faced difficulty in identifying the threshold limit of a station platform and expressed concerns over the lack of safety barriers at the train station platform. Respondents BL1 and BL2 discussed below:

"We have to make it like a monorail. Monorail he made railings." [Interviewee BL1]

"…the best is actually like an underground train station like near Masjid Jamek where all the doors areclosed. That's actually the safest." [Interviewee BL2]

iii. Vertical connectivity

Lack of lifts especially at older train stations was expressed by respondents OL1 and PH2 below:

"Monorail, I have not taken because previously there is no lift." [Interviewee PH2]

b) Design of street environment

i. Obstruction along the pedestrian pavement

A good pedestrian walkway is an integral component of the public transportation system with a properly designed street environment. In this regard, Respondent LD3 expressed his concerns below:

"... if we want to use the public transportation we have to walk more. So we need to have a better walkway" [Interviewee LD3]

Obstruction along the pedestrian pavement due to potholes, protruding poles and uneven conditions of the pavement due to improper maintenance of the landscape was experienced by Respondents OL2 as quoted below:

"Pavements at bus stops are bad because of the trees." [Interviewee OL2]

Respondent BL5 mentioned obstruction due to poor workmanship causing uneven pavements.

"The pavement is usually not well paved. The tiles are uneven. I have fallen a few times already. I find that the tiling is not good. Sometimes they come out. And then there is a hole there. Holes I can see, but uneven tiling I can't see." [Interviewee BL5]

The kerb was higher than road level making it difficult for PWD on wheelchair to access the pavement without proper gentle ramps as described by respondent OL3.

"The kerb is very high from the road, if a person is on a wheelchair, you have to go up because the pavement is elevated." [Interviewee OL3]

ii. Inconsistent pedestrian crossing traffic light system

A common problem across all 5 PWD groups was the inconsistent pedestrian traffic light system. Respondent DF5 observed that an irregular pedestrian crossing system with some areas had no crossing with a traffic light push button.

"Difficult to cross the road without using the pedestrian crossing as well as not having traffic light that notifies whether you need to wait or you can walk." [Interviewee DF5]

At some instances, the traffic light was not functioning, thus creating problems for the PWD as explained by respondent DF2 below. Respondents BL1, BL2 and BL4 highlighted the lack of audible traffic lights and audio signals at push button.

"Crossings sometimes I find it like gamble. They must have flashing light. It may be effective to have audio signal and timer. If only yellow lines are provided, it is not safe for people with sight problems. Audible alarm will be very useful." [Interviewee OL3]

LD3 and LD2 discussed the importance of having traffic calming around the zebra crossing area to caution oncoming cars to slow down.

"No zebra crossing and traffic calmer like hump at are" [Interviewee LD2]

iii. Misplaced guiding facilities such as guiding tactile and drain cover

Respondent BL3 experienced difficulties following the improper placement of guiding tactile as below:

"... there is tactile, but the tactile was leading to the big ditch." [Interviewee BL3]

Poor workmanship and low-quality material for guiding and warning tactile also caused obstruction and exposed PWD to risks of injuries as mentioned by BL2 below:

"…sometimes (problem) it is the tactile material. Sometimes the material can get tripped up. It is an installation problem (workmanship of tactile)" [Interviewee BL2]

Improper arrangement of drain cover and material selection resulted in possible injuries. Respondents BL1, BL2, BL3 and BL4 pointed out that the arrangement of the drain cover was aligned parallel to the movement of the pedestrian that may cause tripping and a stuck wheelchair tyre.

"If according to the standard, (drain cover) it has to be horizontal, not parallel." [Interviewee BL4]

c) Design of public transportation vehicle

i. Standardised vehicle features and design to cater for specific PWD group needs

Transportation vehicle should be fitted with PWD-friendly design that caters to the specific needs of PWD groups. For an example, respondent BL2 mentioned the need for audio announcement for both bus and trains indicating stop location and number:

"…how to determine where to stop. It's like being overseas or being in Hong Kong and needing to knowthe specific stop number and name." [Interviewee BL2]

For DF group, alight blinker and visual announcement are essential information while using public transportation. It is also important in the case of an emergency.

"We cannot hear the bell when you press, and you press it couple of time and the driver get really angryand annoyed. There should have alight blinker, or even the steering wheel got blinker." [Interviewee DF1]

d) Safety

i. Unsafe infrastructure and facilities

The complaints by most of the respondents are regarding the dangerous and substandard street environment that includes pedestrian crossing, bus stops, accessible parking, lighting and traffic light. This was substantiated by the responses quoted below. Respondent BL3 mentioned that the pedestrian walkaway he frequents was in bad condition with potholes, protruding metal and disorganised poles.

"The area of my house where the MRT is being built is not okay, it's dangerous. My place is really dangerous in Maluri because I take the bus or take the LRT because now the MRT is being built so there are big holes, there are poles, there are iron." [Interviewee BL3]

Respondent LD1 shared his dangerous experience and difficulties after alighting a bus service due unavailability of bus stop thus, he had to alight on to the main road.

"…but what he (bus driver) did is he stop on the road, there was no bus stop. And people go down. And that was on the main road going to Kota Damansara. That's not proper at all." [Interviewee LD1]

Respondent PH4, who was in a wheelchair, expressed concerns about his safety due to his relatively low elevation whereby the other road users couldn't see him particularly when he transferred from the accessible parking to the transportation building.

"Very dangerous (on the road from parking) because we are very low, and people can't see us." [Interviewee PH4]

One respondent expressed his concerns over the material selection at the pedestrian walkway whereby this material may cause obstruction due to poor maintenance.

"Interlocking pavement is very dangerous, always a problem, sometimes it goes up and down (without maintenance) just cement will do." [Interviewee PH2]

Respondent DF1 mentioned that there was no proper lighting installed at the train station, on the street and in other public areas.

"It is always a problem for us if it is at night and it is dark. The one that I experience was when I was travelling at night taking the train but suddenly the light is not working." [Interviewee DF1]

Finally, respondent OL1 pointed out that the panic button was not available at key public areas that may result in difficulties for the PWD especially the elderly in case of emergency.

"When we consider about elderly, we should consider panic button at public areas in case they fall sick suddenly." [Interviewee OL1]

e) Connectivity

i. Disconnectivity between public transportation facilities

Fully travelling with public transportation was not feasible due to the disconnectivity of the available facilities. Respondent PH2 who used train services noted that he normally drove his private car due to incomplete connectivity between public transportation facilities within his travel journey. There are times the disconnectivity is from the accessible parking to the transit station as quoted below:

"Parking is a problem for us. Because we cannot park far and the connectivity is not there, the flow from the parking place." [Interviewee PH2]

Respondents LD1 and LD3 expressed their dissatisfaction regarding the connectivity and walking distance between transit station and bus stop. PH2 noted the long walking distance from home to bus stop due to bus routes servicing along the main roads.

"Previously, buses (minibuses) go through neighbourhoods. But now, buses don't go, they only run at the main road. Big problem, come out from the housing area, you have to walk 1mile, 2 miles". [Interviewee PH2]

"Not well connected. Even for the normal bus stop it is not properly plan. There is no covered walkway." [Interviewee LD1]

In addition, PH2 mentioned there were instances when the design of bus stop did not connect to its surrounding thus making the kerb inaccessible.

"Once we get down to the bus stop, to wheel across the way, it is not accessible…But the moment you get down the bus, you can go. Sometimes there are bars, the small gap between the bars." [Interviewee PH2]

f) Availability

i. Inaccurate information on arrival and departure timing and waiting time

Respondents LD2 and BL5 experienced long bus waiting time that took more than 1 hour resulting in frustration and a delayed journey as quoted below:

"Waiting time is too long. Sometimes, can be long as 1 hour. Sometimes 15-20 minutes." [Interviewee BL5]

Respondent BL3 also experienced a similar delay in the arrival of the train with a waiting time up to 2-3 hours and resulted in the disrupted activities of the PWD.

"This bad experience is normal; 2-3 hours is normal (train). I had to wait from 6.15 am to 8.15 am because the cable was stolen at that time." [Interviewee BL3]

The unavailability of accurate arrival and departure timings for public transportation services has caused issues in the subsequent travel schedule of the PWD. For instance, LD2 added that missing the anticipated bus resulted in a change of travel plans such as unnecessary additional walking to other bus stops to avoid longer waiting time. Respondents LD2, BL3 and BL5 mentioned the lack of a bus installed with Global Positioning System (GPS) together with a mobile application for accurate arrival and departure times. This was quoted by respondent LD2 as below:

"At least it tells us arriving time, what time for next bus. The other thing that I didn't like about is when they take their falsely time for break." [Interviewee LD2]

ii. Accessible parking

Due to the current first mile problems, PH group preferred to drive to the train station as a first mile solution to access the transit services. However, the parking situation at the transit station may be unfriendly due to abled-bodies deterrent barriers and disconnectivity to the transit station causing breaks in their travel journey. Respondent PH2 voiced his concerns as below:

"Parking is a problem for us. Because we cannot park far and the connectivity is not there, the flow fromthe parking place" [Interviewee PH2]

g) Reliability

i. Irregular transportation vehicle services

Regarding the reliability of transportation vehicle services, the main issue posed by the respondents was on the relatively irregular bus arrival timings compared to other public transportation services such as LRT and MRT.

"LRT (third phase) will go up to Klang and everybody will start using it. LRT no problem but the buses very important." [Interviewee PH3]

Additionally, sometimes due to bad traffic and weather conditions, rerouting and consequently by passing the normal bus stop route resulted in longer waiting hours by the PWD thus causing confusion. These issues were raised by respondent OL2 as below:

"*Time table is not enough. They should have what time do the bus arrive but got problem if the traffic is jam. The problems are we do not know what time they arrive to the bus stop. Not reliable."* [Interviewee OL2]

As for the BL group, this unreliability of timings and bus information such as bus number has caused for their concern that resulted in an unwillingness to take the public transportation services over private transportation.

"The important thing is that we cannot adapt, such as buses, we cannot do anything about. If it comes, we don't know its number. It's things like that that cause problems for us." [Interviewee BL4]

ii. Reliability of facilities and infrastructure

The reliability of facilities and infrastructure were the other challenges faced by the respondents, specifically on the bus information board that malfunctioned and displayed unreliable and obsolete information. Respondents LD3 and LD2 shared their experiences below:

"Rapid KL has made (signboards) what bus is coming. But sometimes the bus has an information boardthat is damaged." [Interviewee LD3]

"Sometimes the information at the board they tell you it's coming show 'tiba' (arrived) sign but the bus not there. You have to what for a while more." [Interviewee LD2]

h) Familiarity and consistency

i. Change of routine

For the BL group in particular, there were no consistencies in design guidelines and change in the specification and SOP posed difficulties to the group. This was substantiated by the respondents as follows:

"The only important thing is that we have to be familiar. If you want to talk about accessibility or the route, not all areas are so accessible. But when the blind person experiences it, the blind person can adapt to the environment at that time." [Interviewee BL4]

Change in SOP routine for example sudden change in the flow of the escalator direction at transit stations without notice caused confusion and danger to the BL group in particular.

"…but sometimes it's a problem. For example, when the escalator, (when) the escalator usually goes down, suddenly the escalator goes up." [Interviewee BL2]

Standardised design for key actions through-out public transportation facilities such as entrance and exit flow of ticket barriers was not carried out resulting in confusion for the BL group. Respondents BL2 and BL4 also agreed on the inconsistency of pedestrian traffic light push button location at different strategic areas as quoted below:

"In other words, even though a place we are not familiar with, like in Brickfield, we (blind) already know where all the push buttons are. But when we get to a certain place we want to press the push button, we don't even know where it is." [Interviewee BL4]

4.2. Management and operation

Challenges within the public transport system on management and operation were highlighted below:

a) Standard operating procedure

i. Lack of assistants on the platform

All respondents shared mutual opinions that on-site assistants are needed on the platform and in key public areas. Respondent PH3 highlighted that:

"Nobody mending the station. KTM should have people help when we buy the ticket that time (people on wheelchair), this is a disabled person." [Interviewee PH3]

"They should inform the staff at the destination, and they get it (portable ramp) ready there." [Interviewee PH2]

Respondents PH2 and PH4 agreed on the importance of immediate assistance in cases such as an emergency:

"Someone needs to be at the platform. When they see someone with disability, they are supposed to bantu dia (help them). Now, the thing is they are not practicing what they preach." [Interviewee PH2]

Identification and arranged assistance with available mobility aids at transportation building and transportation vehicle:

"They (KTM) have portable ramp but they don't use it." [Interviewee PH3]

"Normally bus can kneel down, but sometimes they are lazy, they bus driver don't kneel down." [Interviewee PH3]

"To access the bus ramp, it is manual. The driver has to come down and take the flap and put it down. The new buses, the flap is at the second door. Because the first door, not easy to access by the wheelchair due to the 'selekoh' (bent)." [Interviewee PH2]

Without on-site help, it may lead to safety issues and injuries. Respondent PH1 shared his experience of accident during working day rush hour as quoted in the following.

"There is no (portable ramp), so I am independent. Sometimes I fall, when it's a work day, when I want to go in." [Interviewee PH1]

Respondents PH2, PH3, PH4 all agreed on the possible lack of constant checking:

"We don't see much improvement. [Moderator note: It is just so slow.] Slow or tortoise pace. Top management should observe the staff (spot check) when there is a person on a wheelchair (at the facility)." [Interviewee PH2]

In addition, disability equality training (DET) should be compulsory and conducted regularly to update the knowledge and skill of staff. For example, frontline facing staff should be trained to know how to assist PWD. This was mentioned by respondent PH2 below:

"All frontline counter staff should go for disability awareness training. If a person with disability come, what are the steps you are supposed to do. Counter staff need to be trained, currently they are not trained." [Interviewee PH2]

"They should know how to assist the disabled person. Like the bus rapid, driver should know how to assist the person. KTM, when there's a disabled person, there is a gap between the platform and train. They have to immediately get the thing ready (ramp) and inform the other side (destination) where the disabled is going and the coach (number)." [Interviewee PH2]

ii. Irregular enforcement of abusive activities

Respondent PH2 mentioned the irregular enforcement of abusive activities by the general public on facilities especially PWD-specific facilities, thus making it inaccessible.

"Usability is very important. They should enforce to put a clamp there. When you enforce, then people will be scared, so they wouldn't park easily." [Interviewee PH2]

iii. Inconsistent and unclear information on the availability of facilities and services

Lack of information deters users from travelling due to fear of inaccessibility. Respondents PH2 and PH3 discussed the lack of consistent and clear information on facilities and services.

"Then you will find more people using public transportation, because we cannot use because we don'tknow the situation (gap from the coach to the platform) at the final destination." [Interviewee PH2]

"They should be the schedule at the bus station. Show what bus is coming." [Interviewee PH3]

"If I know an accessible bus coming, I will wait there. But if we wait for an hour there and an accessible bus doesn't come, then that is a problem. How to get to work or go to place on time." [Interviewee PH2]

b) Operation

i. Low frequency of bus trips and insufficient bus route coverage

Low frequency and insufficient bus route coverage result in crowding and long waiting hours causing

inconvenience to the users. Respondents DF1 and LD2 have expressed as follows:

"In the morning you will see a lot of busses coming. But towards evening you have to wait an hour or longer and when the bus come it is really full and packed. The idea is during peak hour there should havemore busses." [Interviewee DF1]

Bus route coverage depends on the number of passengers which creates problems for the PWD due to the long walking distance to reach the next available bus stop. The decision was made subjectively based on a number of passenger demand rather than the necessity to provide inclusive services and coverage.

"Last time the bus used to come in to my place and stop at BK3 at the bus stop there. Then it is busy a bit. Now it didn't come inside. They said this area don't have people. Then this side people complaining why the bus didn't come in." [Interviewee LD3]

ii. Lack of proactive technologies to ease communication and information

The current digital technologies such as mobile connectivity and real time data are good for modern lifestyle. In spite of the availability of fundamental digital technologies, the nation needs to keep abreast with the global advancements for example, real time positioning using GPS can assist the users including PWD to address issues with arrivals and departure information.

"*The problem when there are a lot of people, tend to miss bus. If there are special apps will be good. Or else we will keep missing busses."* [Interviewee DF1]

"Time table is not enough. They should have what time do the bus arrive but got problem if the traffic isjam. The problem is we do not know what time they arrive to the bus stop. Not reliable." [Interviewee OL2]

In addition, the instant report and responses could be achieved with the help of digital technology. For example, accidents and abusive activities can be reported and assisted promptly.

c) Facilities management

i. Irregular management and maintenance of facilities at premises

Facilities on the streets were not properly maintained causing breakdowns prone to accidents. For instance, respondent, DF2 mentioned his difficulties crossing the road due to pedestrian traffic light malfunction below: "But most of the time the pedestrian light is not working and at the zebra crossing people are not bothered to stop for you. But you keep on pressing but if it doesn't work it I so hard to cross. And it is so difficult if you have baby with you." [Interviewee DF2]

Management of the facilities relaxes on the SOP for specific jobs by the workers. For example, often times toilets were locked during peak hours unnecessarily as expressed by respondent PH3

"Sometimes there have the toilet, but they (management) locked them. The toilet seat, there is no seat cover." [Interviewee PH3]

4.3. Public Awareness

The public awareness of the rights of PWD (persons with disabilities) has been found to be inadequate in a particular context. Two main concerns have been identified: Firstly, there is a lack of assistants on the platform, which makes it challenging for PWD to navigate the platform independently. To address this, it is suggested to hire more assistants who are trained to provide support to PWD. Secondly, there is a problem with public misuse of facilities, including PWD-friendly facilities.

a) Public assistance and knowledge on PWD rights

i. Lack of assistants on platform

In the event of lack of available official assistants at public transportation facilities such as bus or train

platform calls for the assistance of the general public as mentioned by respondent BL1.

"So we have to ask around. Just point of clarification, users from Bangladesh, Nepal, Myanmar is veryfriendly and helpful. Sometimes more friendly than our own local." [Interviewee BL1]

However, there are instances where people are hesitant to help as described by respondent BL4.

"So sometimes it's like people's perception of the blind (people) when we go near him, he kind of avoidsus. But I often experienced this when I first used the train." [Interviewee BL4]

Unfortunately, in Malaysia, the awareness of the rights of PWD by the general public is not widely understood and practiced. For example, respondents LD3 and PH1 explained their experience with abled-bodied passengers unwitting abusing the rights of the PWD at public transportation facilities.

"One more thing, penumpang (users) themselves doesn't care for others. They only care for themselves.You see the OKU person come on the bus so you should him to sit at their seat. You not supposed to just sit at their seat and see them suffering climbing the step (not helping)." [Interviewee LD3]

"Sometimes, people have taken my place (designated for PWD), a place for special people in Komuter. Ihad to sit by the door, because there were so many people." [Interviewee PH1]

Inconsiderate and lack of civic-mindedness of the user at the expense of PWD rights causing physical and emotional trouble to the PWD users.

"They don't give any attention, don't give way. That is why, if KTM staff is helping me, they will park there. Then the people have to get out. There is already a mark there with the wheelchair logo there. Butpeople are abusing it." [Interviewee PH2].

b) Public misuse of facilities

i. Misused of public and PWD-friendly facilities

Many instances where the public facilities are being are being misused by the motorist as explained by respondent LD2.

"There is sidewalk but frequently use by the motorcycle. Because of the traffic jam in Jalan Puchong, they usually go up on it and use the sidewalk to avoid the traffic." [Interviewee LD2]

Even in designated areas with multiple signages and warnings, PWD-friendly facilities are being abused by non-PWD users.

"I have experience for train, people occupy seat for elderly." [Interviewee OL1]

"Police car also park at disabled parking. The toilet become a store, they put everything inside (cleaning supplies). They just put a toilet there, but when I go in, I can't use. They disable the toilet." [InterviweePH3].

c) Public awareness campaign

i. Lack of dissemination of information regarding right of PWD

Often time, the information on the rights of PWD is not spelled out and disseminated widely causing frustration and confusion among PWD users. Consequently, there is a lack of concern and awareness by the general public regarding the inclusiveness of all Malaysian society. This issue has been expressed by respondent BL4 as below:

"First and foremost is the problem of societal awareness. Because if we say Universal Design, we need equality." [Interviewee BL4]

For instance, information and advertisement on the correct way to use public transportation with respect to PWD facilities and users were irregularly publicised and reminded as mentioned by respondents LD1 and OL3 below:

"Maybe the bus needs to do advertisement on the proper ways using the bus facilities." [Interviewee LD1]

"Awareness for public when facilities are there but people not aware." [Interviewee OL3]

Awareness and education on rights and assisting. Lack of national publicity through mass media such as TV, radio and other social media avenues as mentioned by respondent BL3 below:

"What we need now is a more extensive campaign, maybe aggressive. Maybe we have to start calling up the TV station for instance. Ask to post this campaign." [Interviewee BL3]

4.4. Policy and Legislation

The policy and legislation surrounding the treatment of PWD (persons with disabilities) in a particular context have been found to be lacking in several areas. Four main concerns have been identified; lack of proactive action taken after the reporting of issues or complaints, problem with compliance with available and updated Malaysian Standards, lack of empowerment of PWD Acts and lack of direction regarding the complaint channel.

a) Post-complaint action

i. Lack of proactive action after issue reporting or complaint

Respondent PH3 expressed his experience reporting an issue but slow action was taken post-complaint.

"We tell them so many times but no improvement. Later I come back and see the same problem. They never go and rectify it." [Interviewee PH3]

However, this is not the case for all complaints. Respondent BL4 has had a good experience with proactive local authorities such as KLCH as mentioned below:

"We always take pictures and send them to KLCH and KLCH will come. Usually, the staff who are therewill take pictures and WhatsApp to KLCH's staff." [Interviewee BL4]

Respondent BL1 added that KLCH has an open approach and listens to suggestions made by the PWD users.

"I think there is one thing that differentiates KLCH from the rest. KLCH has an open approach. It means they can accept we have suggestions. We can talk like that. So, if all government agencies are willing to listen to each other, talk about it." [Interviewee BL1]

Constant discussion and engagement between stakeholders and users were also essential in conveying concerns. Respondent BL

"Actually, we always engage with them (stakeholders). Slowly bit by bit they will do it. It's like a monorailnow it's done. So sooner or later I think it will be done but maybe it will take time." [Interviewee BL1]

b) Standards compliance

i. Lack of compliance with available and updated Malaysian Standards

Respondents PH4 and BL2 discussed the lack of compliance with the Malaysian Standards on premises design asa reference both to the users as well as the authorities and service providers.

"They never put in practice what they are supposed to do." [Interviewee PH4]

"We already have Malaysian Standards. But you (service providers) didn't follow. No reference." [Interviewee BL2]

Correct design specifications should be complied with and be available for all stakeholders of the public transportation system so that accessibility, usability and safety of users could be addressed accordingly. Respondents BL4 and PH3 discussed below:

"…the condition of our pavement needs to follow the correct specifications." [Interviewee BL4]

"Design just follows the standards 1184, they supposed to monitor any damage. There is a manhole on the pavement, very dangerous for the disabled. They already have budget, but they are not doing anything." [Interviewee PH3]

ii. Lack of user-friendly interaction between the authority, service provider with PWD users Respondents

PH3 expressed dissatisfaction with communication gap between the authority and service providers with regard to information on PWD-friendly facilities and services at public transportation premises.

"They didn't consult the users when building it. Toilet is (does) not comply with standards, sometimescannot use, sometimes abled body use it." [Interviewee PH3]

c) PWD Act

i. Lack of empowerment of PWD Acts

Even though there are PWD Acts with regard to accessibility of public space, the empowerment of the PWD Acts was not carried out as expected due to unclear guidelines of PWD Acts. Respondent PH2 discussed this issue below:

"We have acts, but no privity measures. There are laws but with no teeth. You can't penalise. Overseas they can sue the service provider." [Interviewee PH2]

d) Complaint channel

i. Lack of clear complaint channel direction

Respondent PH2 explained the complaint channels and action by PWD in meeting with Transportation Authority:

"Disable parking there should have a number of assistance. When stop there can call people to assistyou. In Taman Jaya they don't bother to help you." [Interviewee PH2].

4.5. Summary of PWD Perception of Public Transportation System in Kuala Lumpur, Malaysia

Table 3 shows the summary of PWD perception of the public transportation system in Kuala Lumpur. It was clearly evidenced that the parameters of accessibility (53.54%) and management and operation (35.05%) were the major concerns of the PWD groups as compared to public awareness (7.94%) and policy and legislation (3.47%) parameters. For the accessibility parameters, the respective PWD groups of OL, DF, BL and LD had more than 50% response while for the policy and legislation parameters, low response rate of less than 10% were responded by PH and BL groups and none from the LD, DF and OL groups.

Data obtained from focus group discussions were entered into NVivo 9 software and analysed. Audio data from video recordings were transcribed verbatim and relevant photographs were supplemented. Figure 1 shows the word frequency summary of the focus group discussion for all PWD groups.

Table 3. Summary of PWD perception on public transportation system in Kuala Lumpur, Malaysia (%)

	Perception of PWD				
PWD group	**Accessibility**	**Management and operation**	**Public awareness**	**Policy and legislation**	**Total**
PH	35.98	42.86	11.64	9.52	100
BL	55.87	29.05	7.26	7.82	100
LD	50.00	39.55	10.45	0.00	100
DF	57.58	39.39	3.03	0.00	100
OL	68.29	24.39	7.32	0.00	100
Average	53.54	35.05	7.94	3.47	100

Note: PH – physical disability; BL – blind; LD – learning disability; DF – deaf; OL – older person

It is worth noting that the parameters of accessibility, management and operation, public awareness and policy and legislation and their sub-parameters were listed from the highest to the lowest percentages as responded by the PWD participants as shown in Table 4.

Table 4. PWD perception parameters (%)

Parameter (Theme)	**Percentage**	**Sub-parameter (Categories)**	**Percentage**
Accessibility	53.54 (100)		
		Design of public transportation vehicle (highest)	15.99 (29.87)
		Design of transportation building	13.95 (26.06)
		Design of street environment	8.04 (15.01)
		Safety	5.37 (10.04)
		Connectivity	3.83 (7.16)
		Availability	2.60 (4.85)
		Reliability	2.58 (4.81)
		Familiarity and consistency (lowest)	1.18 (2.20)
Management and operation	35.05 (100)		
		Standard operating procedure	24.12 (68.81)
		Operation	5.56 (15.87)
		Facilities management	5.37 (15.32)
Public awareness	7.94 (100)		
		Public assistance and knowledge on PWD rights	3.83 (48.30)

		Public misuse of facilities	3.22(40.53)
		Public awareness campaign	0.89(11.17)
Policy and legislation	3.47 (100)		
		Standards compliance	1.35 (38.89)
		Post-complaint action	1.32 (38.09)
		PWD Act	0.48 (13.89)
		Complaint channel	0.32 (9.13)

According to Table 4, the perception of PWD was categorised by percentage ranking. The major issues identified were standard operating procedures (24.12%), the design of public transportation vehicles (15.99%), the design of transportation buildings (13.95%), the design of street environments (8.04%), and transportation operation (5.56%). Although with lower overall percentages, the main issues highlighted on public awareness were public assistance and knowledge of PWD rights (3.83%) and public misuse of facilities (3.22%). On the other hand, the main issues on policy and legislation were standard compliance (1.35%) and post-complaint action (1.32%).

4.6. Summary of PWD Perception of Accessibility

Table 5 shows the summary of PWD perception of accessibility. By and large, the main issues faced by PWD groups were the accessibility perception on the design of transportation buildings (29.87%) and design of street environment (26.06%), followed by the design of public transportation vehicles (15.01%), safety (10.04%), connectivity (7.16%), availability (4.85%), reliability (4.81%) as well as familiarity and consistency (2.20%). Specifically, DF group had more concerns about design of public transportation vehicles (57.89%), followed by safety (26.32%), design of transportation buildings (26.06%) and design of street environment (15.01%). It was noted that there was no mention of familiarity and consistency, availability and connectivity categories by the DF group.

Table 5. Summary of PWD perception on accessibility (%)

	Accessibility (%)								
PWD group	**Safety**	**Reliability**	**Familiarity and consistency**	**Availability**	**Connectivity**	**Design of street environment**	**Design of transportation building**	**Design of public transportation vehicle**	**Total**
PH	5.88	2.94	0.00	10.29	17.65	5.88	38.24	19.12	100
BL	4.00	2.00	11.00	5.00	0.00	33.00	32.00	13.00	100
LD	10.45	11.94	0.00	8.95	7.46	14.93	11.94	34.33	100
DF	26.32	0.00	0.00	0.00	0.00	10.53	5.26	57.89	100
OL	3.57	7.15	0.00	0.00	10.71	10.71	42.86	25.00	100
Average	10.04	4.81	2.20	4.85	7.16	15.01	26.06	29.87	100

Note: PH – physical disability; BL – blind; LD – learning disability; DF – deaf; OL – older persons.

4.7. Summary of PWD Perception on Management and Operation

Table 6 shows the summary of PWD perception of management and operation. Except for OL, all other PWD groups showed high percentages of responses on standard operating procedures compared to operation and facilities management. The average values were 68.81% (standard operating procedure), 15.87% (operation) and 15.32% (facilities management). It is worth noting that, for the LD, PH and DF, the responses on facilities management were relatively low with the values of 1.89%, 7.41% and 7.69%,respectively.

Table 6. Summary of PWD perception on management and operation (%)

	Management and operation (%)			
PWD group	**Standard operating procedure**	**Operation**	**Facilities management**	**Total**
PH	79.01	13.58	7.41	100
BL	88.46	1.92	9.62	100
LD	77.36	20.75	1.89	100
DF	69.23	23.08	7.69	100
OL	30.00	20.00	50.00	100
Average	68.81	15.87	15.32	100

Note: PH – physical disability; BL – blind; LD – learning disability; DF – deaf; OL – older persons.

4.8. Summary of PWD Perception on Public Awareness

Table 7 shows the summary of PWD perception on public awareness. The total average for the PWD perception on public awareness (from the highest to the lowest) was as follows: public assistance and knowledge on PWD rights (48.30%), public misuse of facilities (40.53%) and public awareness campaign (11.17%). Even though the total average of perception for public misuse of facilities was moderate (40.53%), the related values for BL (61.54%) and LD (71.43%) were relatively high compared to other PWD groups. Interestingly, the public assistance and knowledge on PWD rights value for DF was 100.00%.

Table 7. Summary of PWD perception on public awareness (%)

	Public awareness (%)			
PWD group	**Public misuse of facilities**	**Public assistance and knowledge on PWD rights**	**Public awareness campaign**	**Total**
PH	36.36	63.64	0.00	100
BL	61.54	23.08	15.38	100
LD	71.43	21.43	7.14	100
DF	0.00	100.00	0.00	100
OL	33.33	33.33	33.33	100
Average	40.53	48.30	11.17	100

Note: PH – physical disability; BL – blind; LD – learning disability; DF – deaf; OL – older persons

4.9. Summary of PWD Perception on Policy and Legislation

Table 8 shows the summary of PWD perception of policy and legislation. Response (from the highest to the lowest) on PWD act, standards compliance, complaint channel and post complaint channel for PH group was 27.78%, 27.78%, 11.11% and 33.33% and for BL group were 0.00%, 50.00%, 7.14% and 42.85% respectively. However, no responses were obtained from LD, DF and OL groups. The average (from the highest to the lowest) for policy and legislation perception were as follows: 38.89% (standard compliance), 38.09% (post-complaint action), 13.89% (PWD act) and 9.13% (complaint channel).

Table 8. Summary of PWD perception on policy and legislation (%)

	Policy and legislation (%)				
PWD group	**PWD Act**	**Standards compliance**	**Complaint channel**	**Post-complaint action**	**Total**
PH	27.78	27.78	11.11	33.33	100
BL	0.00	50.00	7.14	42.85	100
LD	0.00	0.00	0.00	0.00	100
DF	0.00	0.00	0.00	0.00	100
OL	0.00	0.00	0.00	0.00	100
Average	13.89	38.89	9.13	38.09	100

Note: PH – physical disability; BL – blind; LD – learning disability; DF – deaf; OL – older persons.

5.0 DISCUSSION

The aim of this study was to determine the perception of the PWD on the criteria and factors of accessibility and connectivity of public transportation system in Kuala Lumpur, Malaysia. The findings of the study showed that the perceptions of the PWD were relatively negative towards accessibility in their commute to a destination. This was evident from their discussion that arises frequently on the aspect of accessibility followed by other topics, such as management and operation, public awareness and policy and legislation. This was probably due to constant physical built environment obstacles faced by the PWD groups throughout their public transportation journey.

Information on the perception of PTS for PWD is relatively scarce. In the literature, most studies on the perception of PWD were on the older person's group and mainly focused on the vehicle mode. Therefore, it was difficult to compare between the findings from this study with previous studies on perception. According to Boakye-Dankwa et al. (2019), one of the primary causes for differences in older persons' participation in walking for transportation is the variation in destination accessibility of shops, commercial services, education and recreational destinations. Findings from their study suggest, offering necessary access and amenities for everyday living as well as strong transportation connections to other neighbourhoods can facilitate older adults who want to age in place and maintain an independent and active lifestyle. Therefore, to overcome the obstacles, duly attention on the upgrading of neighbourhood infrastructures and the multi-mode journey that includes buses to service routes to ensure seamless mobility and safe mode to travel, particularly the PWD groups.

This will create perception and awareness by the PWD specific groups with specific needs in the hope that the public transportation system in Malaysia, particularly the neighbourhood will be enhanced and upgraded to be inclusive in the public transportation system in Malaysia.

Based on the FGD findings, the policy and legislation theme received a low response on the complaint channel, due to satisfactory complaint avenues, therefore less discussion was brought up by the PWD groups. For PH and BL, it was interesting to note that a high percentage of responses on post-complaint action which might indicate less satisfaction by the complainants. No response from LD, DF and OL groups indicating that probably there were no issues regarding policy and legislation. The reasons for low and non-response by the LD, DF and OL groups were not known and need further in-depth future studies. Discussions on the PWD Act were initially regarding the irregularities and ineffectiveness in the implementation of the law.

"Kita ada akta (We have acts), but no privity measures. Ada undang-undang tapi tak ada gigi (There are laws but with no teeth). You can't penalise. Overseas they can sue the service provider." [Interviewee PH2]

However, the group did agree on the continuous upgrading in provisions for accessibility and the PWD Act did make a difference in persuading for more improvements.

"At the beginning, they didn't give provision for accessibility (provide access for OKU), and then there is protest by disabled groups because they don't have budget for facilities. Now the committee of transportation, we insisted because we have akta OKU, they started upgrading it. The problem is space constraint. There is limited space to put in the lift, certain places, there is no provision for lift, and they put in chair lift along the staircase." [Interviewee PH2]

Based on the findings of the focus group discussion on PWD perception; the themes, categories and codes can be summarized as shown in Table 9:

Table 9. Translation of themes, categories and codes

Themes	Categories	Codes
Accessibility	Design of transportation building	Unclear accessibility and wayfinding information for different PWD groups
		Unsafe threshold between train and platform
		Vertical connectivity
	Design of street environment	Obstruction along pedestrian pavement
		Inconsistent pedestrian crossing traffic light system
		Misplaced guiding facilities such as guiding tactile and drain cover
	Design of public transportation vehicle	Standardised vehicle features and design to cater for specific PWD group needs
	Safety	Unsafe infrastructure and facilities
	Connectivity	Disconnectivity between public transportation facilities
	Availability	Inaccurate information on arrival and departure timing and waiting time
		Accessible parking
	Reliability	Irregular transportation vehicle services
		Reliability of facilities and infrastructure
	Familiarity and consistency	Change of routine
Management and operation	Standard operating procedure	Lack of assistants on platform
		Irregular enforcement of abusive activities
		Inconsistent and unclear information on availability of facilities and services
	Operation	Low frequency of bus trip and insufficient bus route coverage

		Lack of proactive technologies to ease the communication and information
	Facilities management	Irregular management and maintenance of facilities at premises
Public awareness	Public assistance and knowledge on PWD rights	Lack of assistants on platform
	Public misuse of facilities	Misused of public and PWD-friendly facilities
	Public awareness	Lack of dissemination of information regarding right of PWD
Policy and legislation	Post-complaint action	Lack of proactive action after issue reporting orcomplaint
	Standards compliance	Lack of compliance of available and updated Malaysian Standards
		Lack of user-friendly interaction between the authority, service provider with PWD users
	PWD Act	Lack of empowerment of PWD Acts
	Complaint channel	Lack of clear complaint channel direction

The following suggestions for improvements are summarized in Table 10:

Table 10. Recommendations based on Themes and Categories from FGD

Themes	Categories	Recommendations
Accessibility	Design of transportation building	(a) Clear, visible, contrasting and optimally placed directional signage and facilities label should be installed for clear information for all users particularly the PWD groups. Each PWD group has its own specific information needs which should be addressed by the service providers and authorities. For example, push button for bus information for BL group. (b) A proper threshold dimension should be designed to accommodate the safety of all PWD users to avoid injuries. (c) By and large, the accessible features such as lift, accessible toilet and accessible carpark should be included and standardised for all public transportation facilities.
	Design of street environment	(a) The pedestrian pavement should be properly design according to standards and specification with proper material quality and workmanship. (b) Consistent design guidelines for proper pedestrian crossing traffic light system with push button and audio signal feature should be implemented at every designated location. (c) Proper design of guiding facilities based on site context should also follow the standards and specifications as well as proper material quality and workmanship.
	Design of public transportation vehicle	(a) Understanding of the specific needs of the different groups of PWD such as audio announcement for BL group, visual announcement for DF group and accessible bus (with ramp) for PH group.

	Safety	(a) Pedestrian walkway should follow the standard specifications, free from obstruction and barriers, with proper utilities planning, well-lit and with regular maintenance. (b) Crossing should be well indicated and supported by a functional pedestriantraffic light to assist the seamless pedestrian movement across the main road. (c) Technological aids such as closed-circuit television (CCTV) and panic button to assist the PWD promptly to in case of emergency as well as avoidinjuries and difficulties.
	Connectivity	(a) Identify and ensure all components of public transportation facilities areconnected to one another. (b) Planning bus routes within a neighbourhood with appropriate walkingdistance from home to bus stop.
	Availability	(a) Busses should be fitted with Global Positioning System (GPS) to share real- time location that can be tracked through mobile applications thus accuratebus arrival timing can be achieved. (b) Availability of a well-connected and standardised accessible parking at transit stations.
	Reliability	(a) The public transportation providers should offer reliable inclusive information supported by reliable scheduled public transportation service so that the public transportation users could plan their journey objectively and efficiently. (b) Another aspect is the regular maintenance of supporting facilities and infrastructure to assist users both on site and online to ensure reliability of the public transportation system. (c) Specific facilities should be provided for different groups of PWD, for examples, for the BL group, voice announcement should be installed; and for PH group, ensuring constant clearance available for pull out ramp at the bus rear door.
	Familiarity and consistency	(a) Standardised and consistent design guidelines and SOP for all publictransportation facilities to be implemented and announced from time to time. (b) Consistent PWD friendly design guidelines at all public transportation facilities and locations to be available and accessible.
Management and operation	Standard operating procedure	(a) Assistants at key public areas should be available with regular monitoring of the senior officials and training of staff. (b) Regular monitoring and enforcement at the train station for example observing and subsequently take action on people who abuse the accessibleparking facilities. (c) A clear and consistent information on the facilities and services available at public transportation stations.
	Operation	(a) Proper transportation planning to ensure optimal frequency of bus trip andsufficient bus route coverage to ensure efficient, inclusive and reachability of bus services thus access to all public transportation facilities is possible. (b) Up to date proactive technologies such as mobile application and online services to ease the communication and information is a fundamental component for an efficient and comfortable public transportation system keeping in pace with the development of digital technology.

	Facilities management	(a) The local authority and service provider should check from time to time that all facilities must be maintained as mentioned in the term of reference(TOR) between the local authority and service provider.
Public awareness	Public assistanceand knowledge on PWD rights	(a) Educating the general publics on the rights of the PWD with regards topublic transportation facilities for the PWD as well as the enforcement to refrain abuse of facilities by the general publics.
	Public misuse of facilities	(a) Educating the general publics on the rights of the PWD with regards topublic transportation facilities for the PWD as well as the enforcement to refrain abuse of facilities by the general publics.
	Public awareness	(a) Proactive and progressive advertisement and information dissemination through education as well as national mass media channels, such as TV, radio and other social media methods to create awareness and public consciousness as a developed nation of inclusive society including PWD.
Policy and legislation	Post-complaint action	(a) Proactive and open discussion between PWD users and stakeholders are important understand user's concerns and stakeholders' action and future planning on improvement of infrastructure and services.
	Standards compliance	(a) The authority and service provider should comply the available and updated Malaysian Standards to ensure correct design specifications will be provided to all users including PWD groups. (b) Transparent communication and interaction between the stakeholders should be provided to ensure efficient services for the PWD groups in their travel plan.
	PWD Act	(a) Updating the PWD acts with clear empowerment of the authority andservice provider.
	Complaint channel	(a) Clear instructions on reporting issues and complaints for the general publics. Multiple channels could be created and managed to ensure the issue could reach the authority responsible effectively and efficiently.

a) Accessibility

i. Pedestrian walkway should be well connected and follow the standard specifications, free from obstruction and barriers, with proper utility planning, well-lit, good material quality and workmanship with regular maintenance supported by a functional pedestrian traffic light with push button and audio signal to assist the seamless pedestrian movement across the main road.
ii. Identify and ensure all components of public transportation facilities are reliable, available, consistent, safe and connected to one another.
iii. The public transportation providers should offer reliable inclusive information supported by reliable scheduled public transportation service so that the public transportation users could plan their journey objectively and efficiently. Busses should be fitted with Global Positioning System (GPS) to share real-time location that can be tracked through mobile applications thus accurate bus arrival timing can be achieved.
iv. Clear, visible, contrasting and optimally placed guiding and directional signage and facilities label should be installed for clear information for all users particularly the PWD groups. Each PWD group
v. has its own specific information needs which should be addressed by the service providers and authorities. For example, push button for bus information for BL group.
vi. A proper threshold dimension should be designed to accommodate the safety of all PWD users to avoid injuries.

b) Management and Operation

i. Assistants at key public areas should be available with regular monitoring of the senior officials and training of staff and subsequently take action on people who abuse the accessible parking facilities.
ii. Regular monitoring and enforcement at the train station for example observing
iii. Clear and consistent information on the facilities and services available at public transportation stations. Proper transportation planning to ensure the optimal frequency of bus trips and sufficient bus route coverage to ensure efficient, inclusive and reachability of bus services thus access to all public transportation facilities is possible.
iv. Up to date proactive technologies such as mobile applications and online services to ease communication and information is a fundamental component for an efficient and comfortable public transportation system keeping in pace with the development of digital technology.
v. The local authority and service provider should check from time to time that all facilities must be maintained as mentioned in the term of reference (TOR) between the local authority and service provider.

c) Policy and Legislation

i. Updating the PWD acts with clear empowerment of the authority and service provider.
ii. The authority and service provider should comply with the available and updated Malaysian Standards to ensure correct design specifications will be provided to all users including PWD groups.
iii. Transparent communication and interaction between the stakeholders should be provided to ensure efficient services for the PWD groups in their travel plan.
iv. Proactive and open discussion between PWD users and stakeholders is important to understand users' concerns and stakeholders' actions and future planning on improvement of infrastructure and services.

6.0 CONCLUSION

This research on the perception of PWD groups revealed that accessibility of public transportation in Kuala Lumpur is a major concern. The PWD perceived lukewarm towards public transportation system facilities, services and safety. It is recommended that the framework of a holistic and comprehensive public transportation system with reference to neighbourhood in Kuala Lumpur to be considered for the implementation of inclusive public transportation travel. The three main components of public transportation travel [interface: street environment; land use and destination: buildings (including transportation hubs); and public transportation service: public transportation vehicle] should be integrated in planning and implementation to ensure efficient and seamless connectivity. Each of these components has four related components comprised of stakeholders (government), Malaysian Standards, 'design, condition and services' and 'awareness and education'. The main issue of these complex dynamics is the lack of coordination between the components, for example, buildings and street environment (street area) and street environment and public transportation vehicles (bus stop and embarkation point), causing inefficient implementation of the seamless journey. Thus, the collaboration among the stakeholders should be highly emphasised to ensure inclusivity and sustainability of public transportation infrastructure in Kuala Lumpur, Malaysia.

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