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# Transport equity in Sri Lanka: Experiences linked to disability and older age

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## ABSTRACT

**Introduction:** Transport, a well-recognised determinant of health, is particularly salient to well-being and equitable health outcomes amongst older people and people living with disabilities living in low-and middle-income countries. This study explored the facilitators and barriers for safe and accessible transportation from the perspectives of older people and those living with disabilities in Sri Lanka.

**Methods:** The community-based qualitative research study involved eight focus group discussions conducted among older people (60 years and above) and people living with disabilities (physical, sensory, learning impairment; aged 12 years and above) in the Colombo district, Sri Lanka. Thematic analysis was used to analyse data.

**Results:** The transport challenges perceived by participants were multi-faceted and often inter-related. Participants identified barriers embedded in the built environment and transport infrastructure, such as poorly designed road systems and public vehicles, unsatisfactory services, lack of representation in road development programs, reduced opportunities for meaningful participation in the society and negative attitudes of the general public, as limitations for safe and accessible transportation. Poverty exacerbated the transport inequities experienced by the participants, affecting their quality of life and well-being.

**Conclusions:** The study findings indicate the need for a national policy and legislative reforms that prioritise age- and disability-inclusive transport systems and infrastructure, and accessible and affordable transport modes in Sri Lanka. To ensure equitable opportunities and wellbeing, it is also imperative to foster meaningful relationships and positive societal attitudes towards older people and those living with disability.

## 1. Introduction

Mobility is closely related to independence, well-being and quality of life (Shafirin et al., 2017). Mobility needs among people living with disabilities and older people vary according to physical, sensory or cognitive impairments, and other age-related comorbidities.

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For older people and people of all ages living with disabilities, safe and accessible transportation facilitates access to life enhancing opportunities such as employment, education, health and recreational activities (Hine and Mitchell, 2001). In contrast, road safety risks and transport disadvantages hinder social participation, exacerbating social exclusion with adverse impacts on well-being and quality of life for these vulnerable population groups (Stanley and Lucas, 2008).

Globally, older people, those living with disability, and the socially disadvantaged are among those at increased risk of road traffic injuries (Zambon and Loring, 2014). Also, these groups are often neglected in road safety research, road planning and transport policy development especially in low- and middle-income countries (LMICs). Studies published in LMICs, describe the poor road conditions, lack of user-friendly transport vehicles and negative behaviours of service providers as transport barriers for these population groups (Ipingbemi, 2015; Olawole and Aloba, 2014; Whitzman et al., 2013). We believe, context specific evidence is needed to better understand the risks relating to safe and accessible transportation, as the built environment, socio-political and cultural factors can impede efforts to promote an equitable transport system.

Sri Lanka, a middle-income country, has one of the most rapidly aging populations in the world (De Silva, 2007). In 2012, people aged 60 years and above accounted for 12.4% of the total population, and this was projected to increase to 28.5% by 2050 (Department of Census and Statistics, 2012). According to road crash statistics from 2013, older people were accounted for over a quarter of those who were fatally injured in Sri Lanka (University of Moratuwa, 2014). While an estimated 8% of the population (1.6 million people) in Sri Lanka live with disabilities, information on transport issues relating to this demographic group is scarce.

### 1.1. Overall aim of the study

With growing awareness that vulnerable road users have particular needs and risks using road transport systems, a greater understanding of the perceptions, lived experiences and aspirations of these population groups are vital in informing policy solutions to promote safe and accessible transportation. The overall aim of this research is to understand the barriers and facilitators for safe and accessible transportation from the stand-point of older people and people living with disabilities who are resident in an urban area of Sri Lanka. The evidence generated can assist with developing appropriate policies and interventions to meet transportation needs, and hence facilitate greater independence and well-being for these population groups.

### 1.2. Conceptual framework

This study was informed by the equity principles embedded in Rawls' 'Theory of Justice', which promotes the greatest possible liberty for all, and justifies inequalities so long as they most benefit the least advantaged (Rawls, 1971, 2009). Transport equity involves transport policies, facilities and services that accommodate all users and additional resources or accommodations may be necessary for transport systems to be inclusive (Vasconcellos, 2014).

Socio-demographic characteristics such as poverty, older age, living with disabilities, or language barriers predispose people to transport disadvantage and reduce access to using available transport facilities and options (Guimarães et al., 2019). Environmental risk factors for safe and accessible transportation such as poor road status, vehicle characteristics and bad weather etc. exacerbate the inequities for people with these characteristics (Currie and Delbosc, 2011). The consequences can include poor health status, lack of opportunities for meaningful social participation, and social exclusion (Lucas, 2012).

Understanding the root causes of transport disparities from a social justice perspective highlights the need for inclusive policies focusing on vulnerable populations (Azetsop, 2010). Many researchers, policymakers and institutions in high-income countries have adopted this approach in transport research, policy planning and evaluating road safety measures.

**Table 1**

Question prompts used in focus group discussions.

Aim	Question prompts
Important travel destinations and main mode of travel	What are the important places to which you travel frequently and how do you travel generally?
Awareness regarding safe and accessible transportation	What is your understanding of safe and accessible transportation? How safe do you feel travelling in your area?
Perceived barriers and facilitators for safe and accessible transportation	What are the barriers and facilitators for people living with disability (or older people) in using transportation? In your opinion and experience how do you find the conditions of roads while walking, riding or driving (or passenger)? How do you find the condition of transport vehicles and services? Tell me about the attitudes and behaviour of the general public and service providers?
Impact on daily life	How do you think that limited road safety and accessible transportation facilities have affected your travel and hence opportunities and quality of life?
Participation in road development plans	Do you participate in road planning or give your views and suggestions at any stage of road constructions? If so, how and to what extent? In your opinion, who should take the responsibility to develop safe and accessible transportation for people living with disability (or older people)?
Suggestions	What interventions do you think would make the biggest difference to improve road safety and safe transport systems for people living with disability (or older)?
Further views	Is there anything else we have not discussed about safe and accessible transportation that you wish we had?

This theoretical background informed the development of the aim, methods, question prompts, analytical procedures and interpretations of this research.

## 2. Methods

This study was a community based qualitative research study. We collected data from January to April 2017 in three purposively selected divisional secretariat divisions (Dehiwala, Kesbewa and Ratmalana) in the Colombo district, which includes the capital city of Sri Lanka. Public buses, three-wheeled taxis and railway are the main public transport services operating in Sri Lanka. Many urban roads are congested and lack infrastructure facilities such as traffic segregation and well-paved sidewalks.

Focus group interviews generate data through interaction between research participants. These discussions can highlight cultural values and facilitate collecting information from people who cannot read or write (Brown et al., 2006). We employed focus group discussions and used semi-structured question prompts (Table 1) as stimuli to obtain information about individual expressions and interpersonal conversations. We took additional care to minimise the silencing of individual voices of dissent amidst the voicing of majority norms by making provision for participants to provide further information in confidence to the facilitator at the end of the session.

We conducted eight focus group discussions: four with older people (60 years and above) and four with people aged 12 years or older (and their parents/guardians as proxy participants where necessary) who experienced physical, sensory, or learning impairments (Table 2). We recruited older people from 'Elders Committees' in each of the three divisional secretariats and people living with disabilities from two institutions (a vocational training centre for people with disabilities and a special needs school) and 'Disability Committees' in the study area. The Elders Committees and Disability Committees are facilitated by the Social Services Departments in each divisional secretariat division in Sri Lanka to promote the welfare and financial capabilities of these population groups. These meetings are held monthly. We obtained ethical approval for this study from the Ethics Review Committee of the Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka (No. 48/16) and obtained permission from the three Divisional Secretaries of the study area. Prior to recruitment, we obtained informed written consent from all participants and we performed all research procedures in compliance with relevant laws and guidelines.

VT conducted all focus group discussions in Sinhala language (one of the national languages of Sri Lanka) as agreed by all participants. A research assistant took notes and oversaw the technical aspects of the sessions, such as recordings. Focus group discussions took 60–90 min and were audio-recorded. VT transcribed the recordings and translated these to English immediately following the session. Translated data were managed and analysed with the support of NVivo 11 software.

Thematic analysis (Braun and Clarke, 2006, 2013) of the data was selected for this study. VT familiarised herself with the data by facilitating all focus groups, transcribing and translating discussions, cross-checking translated data with audio-records and having debriefing discussions with co-authors. Through careful reading of transcripts following the initial two focus group discussions, we identified key issues, views and suggestions related to safe and accessible transportation, which were used to improve question prompts and their sequence in subsequent group discussions. Throughout, VT developed memos relating to observations and ideas. In the process of immersing in the data, VT read translated documents and memos several times. In discussion with co-authors, VT maintained inclusivity of all relevant data throughout the coding process. We examined outlying views and conflicting opinions which helped to inform interpretations of the overall dataset. Through critical and analytical reading, we developed and reviewed initial categories, with titles and descriptions capturing the essence of participants' speech relating to research aims. We then grouped categories and identified initial themes. We reviewed these provisional themes as a whole, producing a map of their inter-connections and relationship to the research questions. All provisional themes were derived from the data. At this stage, VT shared provisional findings at meetings/conferences attended by older people and people living with disabilities, including study participants. The comments and suggestions received from these interactions provided the opportunity to reflect on themes and sub-themes. Finally, we defined and named a robust set of overarching themes.

## 3. Results

Eight focus groups: four with older people and four with people living with disabilities, with 6–10 participants in each were held.

The most commonly visited places cited by participants were neighbouring houses, relatives' homes, the temple, hospital, shops and community meetings. The participants from the vocational training centre and the special needs school travelled daily to their

**Table 2**  
Focus group characteristics.

Focus group	Institution/committee	Age (in years)	Gender	Key disabilities declared by participants
1	Elders committee	60–80	5 male, 4 female	Visual, hearing, physical
2	Elders committee	60–78	4 male, 4 female	Visual, hearing, physical
3	Elders committee	60–75	2 male, 8 female	Visual, hearing, physical
4	Elders task committee	62–70	7 male, 3 female	Visual
5	Special needs school	18–28	3 male, 4 female	Visual
6	Special needs school	15–26	3 male, 3 female	Hearing
7	Vocational training centre	14–30	5 male, 2 female	Physical, learning
8	Disability committee	25–68	5 male, 5 female	Sensory, physical, learning

institutions if not resident at the institute. Only a few participants went daily to a place of work. For many older participants, public buses were the primary mode of travel. Participants with disabilities used public buses or three-wheeled taxis as their main modes of transport. Many participants who were physically able to walk said that they travelled short distances by foot. The majority of the participants seldom had access to a car.

We developed four key themes representing the range of influences for safe and accessible transportation as structural, services, socio-cultural and individual factors (Fig. 1). We identified fourteen sub-themes, many of which were interrelated. In quotations, people living with disability are cited as LWD.

3.1. Theme: Structural factors

Participants identified several built environment measures as barriers for safe and accessible transportation.

3.1.1. Main roads and by-roads

In general, participants felt the physical dimensions of the road infrastructure, particularly pedestrian environments, were not safe. Roads had a busy atmosphere with too many people and too many vehicles:

*He does not like the busyness. People, speeding vehicles ... he feels fear. He holds my hand tightly whenever we walk on the road. Only lets go (of my hand) when we are inside the school gates. (Parent of an LWD: FG5-P2)*

Walking on the road was identified as a challenge by the participants. Many feared getting injured on the road and were extra cautious in this environment:

*We have to be very careful about the vehicles and other people on the road. The moment we look away ... end of the story! (Older: FG2-P2)*

Most of the main roads and by-roads had recently been resealed in the area; however, many participants expressed their annoyance over continuous road works and associated difficulties negotiating around road work and waste of resources. The key reason was that there was no proper co-ordination between the relevant authorities involved in road construction:

*First they (Road Development Authority) mend (the road) and lay the carpet. Then the Water Board breaks it to put-up water lines. Then in a few weeks, the Electricity Board comes and again breaks it to put-up electricity posts. And once again, in few months, Telecom comes and digs it to put-up telephone cable posts. Their work is not co-ordinated. They forget to reconstruct the damages (to the road) altogether or delay for months. (Older: FG5-P2)*

3.1.2. Pavements and walkways

The lack of sidewalks and pavements, or their narrowness, were key risks for safe transportation. This topic typically generated a lot of interaction among the participants in focus groups. The obstacles on the pavement and unevenness were felt particularly dangerous by people with sensory and physical disabilities. The pavements were often obstructed by posts, bill-boards, parked vehicles and vendors:

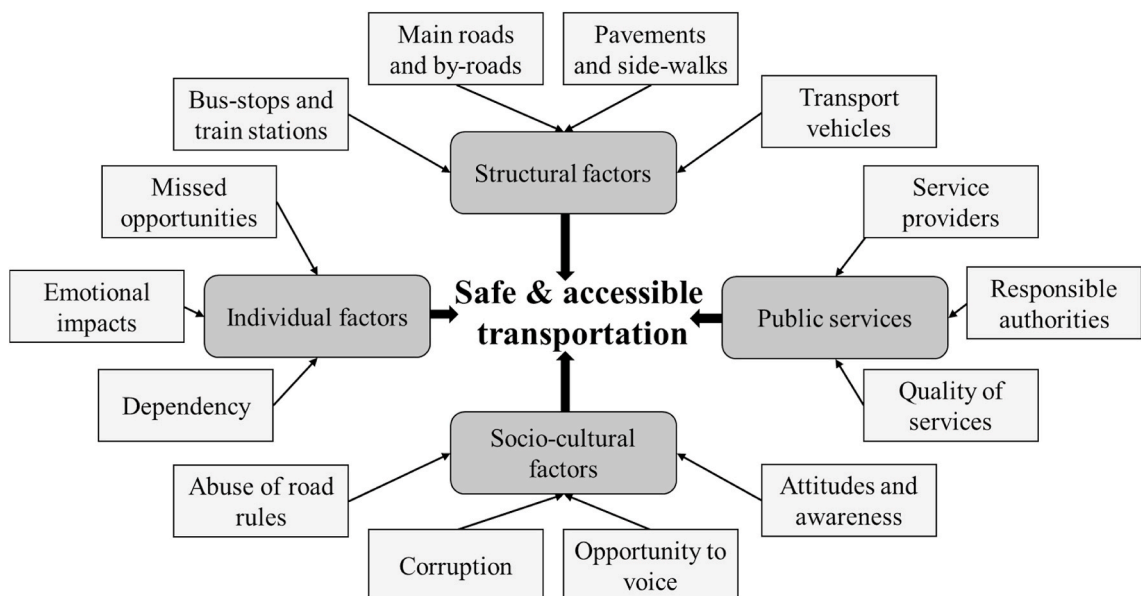


Fig. 1. Perceived barriers related to safe and accessible transportation of older people and people living with disability – Thematic Map.

*There is no pavement at all in some places. We have to climb over nearby trees to be safe and avoid being run-over! (Older: FG4-P10)*

*Conditions of the pavements here are dangerous to everybody. Three-wheelers, bicycles run on the pavement and park on the pavement. We are compelled to walk on traffic lanes. (LWD: FG7-P6)*

Participants were also concerned about the lack of emphasis by the authorities on road-side drainage systems. They indicated that the drains were not covered and were filled with filthy water at many places:

*Once I fell into one of those (drains) and got injured. The drainage at the bus-stop is the nastiest. (Older: FG4-P7)*

### 3.1.3. Transport vehicles

The inaccessible design of public buses, trains and stations was a significant barrier to safe transportation which created physical and emotional discomfort for all participants. They discussed how it is difficult to get into the public buses because the foot-boards are too high with several steps of differing shapes. Participants spoke of avoiding trips by public bus for these reasons. Several participants felt that trains were no different from public buses.

Participants also felt that the poor design of public transport vehicles created problems relating to personal space for women:

*Buses are crowded and all squashed. We travel standing on one leg! The aisles are too narrow. It creates an issue if a male wants to move through when a female is standing. (Older: FG1-P5)*

Alterations to the sound of the horn of three-wheeled taxis made one participant with visual impairment confused about identifying approaching vehicles. Another participant living with physical disability felt that although they were compelled to travel in three-wheeled taxis, those were not comfortable as access to them is too narrow and too low. In support of these remarks, other participants expressed their concerns over the contribution of small-sized three-wheeled taxis to the traffic volume.

### 3.1.4. Bus-stops and train stations

The physical location of bus-stops was an issue for some participants. One older female participant felt the bus-stop was inconveniently located in front of a bar and next to the petrol station, which meant the area was crowded at all times. This generated agreement amongst the group and several other examples of congested bus-stops were mentioned. Another participant added issues about the dimension of train stations:

*Platforms (of the train stations) are too short. If your compartment misses the platform, you need to jump about 5-6 feet out of the train! (Older: FG4-P9)*

Other participants noted that bus-stops and train stations were not clean and frequently occupied by beggars. Litter by the side of the road or near bus-stops was discussed as being hazardous for safety and health. In response to this discussion, one participant recalled her experience as follows:

*Once I slipped over some animal litter and fell on a garbage bag which was full of meat waste and dumped aside the bus-stop. Stray animals are attracted to this trash. I was injured and suffered from an itchy rash for weeks for which I had to see a doctor. (LWD: FG8-P5)*

### 3.1.5. Participants' suggestions for improvement for structural factors

A broad spectrum of pedestrian and passenger environment improvements were suggested by the participants. These included well-maintained design aspects of road systems (safety, comfort, lighting, traverse time at crossings and shelter) and disability-friendly transport vehicles. Participants with disabilities such as physical and visual impairments suggested obstacle free pavements. In addition, the use of visual or audible cues was highlighted as useful:

*We do not know when to cross ... it is helpful if there is an audible signal with colour lights. (LWD: FG5-P2)*

In focus groups with older participants, standardised measures for road development and transport vehicles were often suggested:

*There should be a standard plan for road systems which allows the roads to be used not only by vehicles but by pedestrians as well. Essentially the public bus should be re-designed. (Older: FG4-P10)*

## 3.2. Theme: Public services

Participants identified stakeholder management, behaviours of service providers and quality of service related to public transport as factors influencing safe and accessible transportation.

### 3.2.1. Service providers

Most participants felt that drivers of public bus services were involved in dangerous driving. The participants thought that drivers speed and chase each other to increase their daily revenue by picking up more passengers. Some felt pressured by having to get-in or get-off the bus quickly as ordered by the bus-conductor:

*It is stressful. Conductors shout to hurry-up because another bus is chasing theirs. (Older: FG3-P7)*

Because of their slow mobility pace, participants in this study were physically and verbally abused by drivers and conductors. Some thought that young males become bus drivers without proper training and understanding about commuter needs:

*Once my child couldn't understand what the conductor was saying. The conductor yelled at him and was not patient enough to understand him. Since then, he (child) doesn't travel alone. (Parent of an LWD: FG6-P5)*

In response, similar views about drivers were shared by other participants. Drivers were reluctant to stop for older people or those living with disabilities. Participants felt that either the drivers were not aware or did not care about the challenges faced by these population groups:

*Drivers are impatient. They are not aware of our difficulties. They speed ... then brake ... so we swing! If we try to speak, they ask us to leave the bus. (LWD: FG2-P1)*

However, following narration of a pleasant experience with a bus-conductor by one of the participants, several others noted that, occasionally, there were kind and helpful drivers and conductors. Positive behaviours of service providers were important for participants as they felt they were being cared about.

### 3.2.2. Quality of services

Participants commented that the quality of public transport service was not satisfactory. Long waiting time for buses and abrupt cancellation of services rendered their journeys even more arduous. In addition, issues related to loud music on public transport and beggars were highlighted:

*They play low-quality films and music in high volume. We are forced to listen. The driver doesn't even hear the bell because of the noise. (Older: FG1-P7)*

*A huge problem here is beggars. Some beggars are sick people. Some sell food; fruit; carry knives. Those people are making a living. But it is troublesome. (Older: FG4-P10)*

Though not very comfortable, opting for three-wheeled taxis were inevitable for some participants living with disabilities. The public bus either did not run on their roads or the buses were considered more uncomfortable. However, the cost of the taxis was perceived as very high relative to participants' low economic status. In this regard, the cost of bus fares also represented an obstacle for participants with frequent travel needs.

### 3.2.3. Relevant authorities

The role of relevant authorities responsible for the quality of public services was queried on several occasions, particularly by older participants. Participants felt that authorities responsible for planning, implementing and monitoring of road systems, public transport services, social services, education and legislature were not functioning at an optimal level and that they did not have effective long-term strategies. This was a critical element resulting in increased risks for road traffic injuries and safe and accessible transportation:

*It doesn't seem that the government authorities have sustainable plans. They spend millions of taxpayers' money for constructions, but no one maintains or monitors the projects ... so back to square one in no time. (Older: FG1-P3)*

### 3.2.4. Participants' suggestions for improvements to public services

In order to meet the needs of older people and people living with disabilities, participants suggested improvements to quality of services, disciplining for poor behaviour among conductors and drivers, and maintenance and continuous monitoring of work from relevant authorities.

## 3.3. Theme: Socio-cultural factors

Participants identified some social practices and cultural norms as barriers for safe and accessible transportation.

### 3.3.1. Abuse of road rules and corruption

Participants described observing breaches of road rules including speeding, weaving in and out of lanes, and running through road crossings. The buses, motor-bikes and three-wheeled taxis were identified as the key culprits. Participants expressed their disapproval regarding the prevailing corruption amongst enforcement agencies, which allows wrong-doers to evade penalties and ultimately leading to unsafe road environments:

*Three-wheelers, buses, motor-bikes ... they all breach road rules and get away with it by bribing. (Older: FG1-P8)*

Some participants were of the view that although people were aware of the road rules and regulations, they choose not to follow them as law enforcement was inadequate. Most participants embraced the view of implementing rigorous legislative strategies for people who violate road rules and practices.

### 3.3.2. Attitudes and awareness of the society

Participants discussed some negative experiences they had while travelling on buses which they often attributed to the attitudes of the general public. Those living with disabilities particularly emphasised that they did not need any sympathy from the public but an understanding of their situation:

*When we travel in a bus, they want to know the whole story of my disability ... and they sympathise, which is not needed. (LWD: FG8-P5)*

Some behaviours of the public were described as causing discomfort:

*Nobody is concerned about others. (If there is) just a little delay (in moving), they honk as if they are chasing elephants! (Older: FG1-P6)*

*If two of these children are talking (in sign language), all the people in the bus stare at them, like looking at some extinct animals! (Parent of an LWD: FG6-P1)*

Participants felt today's society, particularly the younger generation, as fast-moving, money-minded, and both inattentive and having less awareness towards older people or those living with disabilities. It has become a transport barrier as participants have to compete with the general public for services:

*People are in a rat-race. They are not aware of disabilities. There is no respect for elders. We have to struggle with them for seats and other things. Young males sleep when old females are standing in the bus. (Older: FG3-P4)*

However, some participants noted that they could still see the positive socio-cultural values of people from time to time among all other negative experiences:

*Some laugh at us, cheat, insult, but some people do care and are genuinely helpful. (LWD: FG8-P7).*

### 3.3.3. Opportunities to voice opinions

Lack of an opportunity to express their views was also highlighted by participants as a limitation for safe and accessible transportation. Participants expressed their discontent about a lack of meaningful engagement of older people or those with disability in local developmental committee meetings:

*There is a developmental committee meeting conducted by the office of divisional secretariat every month. For that, representatives from civil society, police, provincial politicians and others participate. But there is no representation from elders committees. It is upsetting. No place to express our views and suggestions. (Older: FG1-P2)*

### 3.3.4. Participants' suggestions for improvement of socio-cultural factors

Participants wanted rigorous law enforcement against violations of rules and corruption in improving safe transportation.

A common suggestion from participants was to create awareness among service providers, officials and the general public to cultivate positive attitudes towards older people and those living with disability. Some proposed educating children at home and school regarding disabilities and older-age-life. They highlighted mass media as an effective way of disseminating these messages:

*If everybody is kind to one another at all times, there will not be problems. When we get down from the bus, if the driver has patience, we will not be scared. We need to educate everyone. (LWD: FG7-P3)*

Participants suggested opportunities for meaningful participation in official programmes of local as well as National Events such as the Independence Day, New Year Celebrations and 'Vesak' Festival which would help them to have greater visibility of their representation in the society.

Basic training in sign language for the whole community was suggested emphatically by some participants living with disabilities to minimise the communication gap between hearing/learning impaired people and others. They felt this would facilitate access to transportation services.

## 3.4. Theme: Individual factors

Participants described the impact of the public transport system on their day-to-day lives.

### 3.4.1. Emotional impacts

Participants spoke of their emotional burden due to challenges with and limitations of the present public transportation system. They felt embarrassed about the harsh behaviours of service providers and public and were mentally exhausted due to fear of injury, feelings of anxiety, insecurity and powerlessness:

*Conductors go up and down in the bus to collect money .... harassing female passengers. Sometimes we are being pushed and dragged. It is embarrassing when they yell at us to hurry up. (Older: FG4-P10)*

*Honestly, we are fed-up with this system. (LWD: FG8:P3)*

### 3.4.2. Missed opportunities

There was general agreement among participants that poor public transport system has resulted in missed opportunities in obtaining services and participating in societal activities. The limited transport options have constrained the number of journeys they take and have caused delays in obtaining services:

*We miss a lot of activities as we do not have regular transport services. For instance, by the time we find a three-wheeler and go to the hospital, we are late to collect the clinic number (clinic appointments). (Older: FG3-P7)*

### 3.4.3. Dependency

Physical and financial dependency were barriers to safe and accessible transportation. Many participants living with disabilities needed a companion when travelling given the barriers to independent mobility (such as the absence of tactile paving, visual/audible/tactile road maps, and disability-friendly vehicles). The majority of participants did not have a stable income and had to depend on

their children, relatives and friends to assist with the cost of transport:

*People using wheel-chairs need assistance to get into a vehicle. And most of the time need someone else to accompany them. For that, there is a cost involved. Bus fare is high. Three-wheeler fare is higher. Most of the elders don't have any income. (Older: FG4-P2)*

#### 3.4.4. Participants' suggestions for improvement of individual factors

Both older people and those living with disabilities believed improving structural and socio-cultural factors in the transportation system would improve their personal experiences by reducing emotional impacts, missed opportunities and dependency.

#### 3.5. Key differences identified between and within participant groups

The older participants focused their discussions more on the structural, socio-cultural and individual factors that impact on safe and accessible transportation. The participants who held administrative positions in their committees were keen to highlight the need for their representation in developmental committees, irregularities in quality of services and prevailing corruption in the country. While they shared many perspectives in common, people living with disabilities demonstrated variations in expressed needs for safer transportation. For example, participants with visual impairments were concerned about audible signalling systems and pavement quality. In contrast, participants with hearing impairments emphasised educating the public about basic sign language.

## 4. Discussion and conclusions

This study explored the perceptions of older people and those living with disabilities regarding barriers and facilitators for road transport related mobility in Sri Lanka.

### 4.1. Overarching findings

Vulnerable road user groups who participated in our study face numerous barriers to safe and equitable transportation, which limit their travel or result in the avoidance of journeys altogether. The busy atmosphere in and around road systems, including fast moving vehicles, posed challenges to mobility with participants having to take extra care on roads. The pedestrian environment, especially the pavements and walkways, are broken, obstructed, or contain open drainage and are not user-friendly. Lack of infrastructure facilities such as audible traffic signals, street lamps and, convenient and clean bus-stops and train stations were negative influences for safe travelling. These findings are similar to those reported previously from other LMICs such as obstructed walkways and inconvenient bus-stops (Aceves-González et al., 2020; Ajayi et al., 2020). Participants voiced fear about, and were challenged, using the transport system due to increased risk of injury and inaccessibility. Consistent with the study findings, the accumulation of garbage on streets has been recognised as a major health and safety issue in Sri Lanka (Liyanage et al., 2015).

The poor coordination of responsible authorities around the development of road systems was identified as another barrier to safe and accessible transportation. Continuous and apparently uncoordinated road work by various authorities operating at different times blocks access to footpaths and roads, creating additional barriers to travelling. The importance of collaborative work amongst all relevant authorities in reducing road traffic crashes and promoting safe transportation and mobility has been shown in the literature (World Health Organization, 2018).

Boarding constraints and poor design of public transport vehicles, as shown in many other LMICs (Ajayi et al., 2020; Olawole and Aloba, 2014) are critical design-related barriers for safe and accessible transportation for these vulnerable road user groups. In addition, the quality of public transport service is unsatisfactory with long waiting-times, troubles with loud noise, and beggars and vendors on board adding further challenges to journeys that were already difficult.

The majority of participants in this study were socio-economically disadvantaged. The use of three-wheeled taxis was dictated by affordability and often only used in emergencies. The monetary cost of travel had prevented or limited travel trips, and thereby access to facilities and services for the participants. Earlier studies conducted in LMICs corroborate these findings (Olawole and Aloba, 2014), and some have shown low fares improved passenger ability to access public transport (Eboli and Mazzulla, 2010).

Participants believed the attitude of too many service providers was sub-standard. Citing that the quest to earn more money, bus drivers and conductors neglect and abuse older people and people living with disabilities. Abusive behaviour of drivers towards these population groups has been reported in other studies conducted in LMICs (Fouracre et al., 2006; Ipingbemi, 2015). Participants in this study were sensitive to how they were addressed and cared for. Participants appreciated and valued the caring and responsive attitudes of some drivers and conductors towards them.

Participants identified that drivers of three-wheeled taxis and motor-bikes often violate road rules and are well aware of breaching them; however, they continue to do so as there was no rigorous law enforcement. Studies conducted in Sri Lanka found that bus drivers and three-wheeled taxi drivers engage in traffic rule violations, such as improper overtaking, overloading and aggressive driving behaviours causing significant risk for road traffic crashes (Akalanka et al., 2012). These studies have also shown that drivers tend to bribe police officers and avoid traffic convictions.

As transport-disadvantaged populations and as individuals, participants in this study encountered several psychological barriers. Many participants feared injury and felt embarrassed, exhausted, insecure and powerless when using public transport. They had to depend on others physically when using public transport. Additionally, the majority were dependent on others for transport costs. Psychological issues and existing physical barriers together with transport system failures limited participants' opportunities for



obtaining services and meaningful participation in the society.

The general public exhibit a mixture of positive and negative attitudes towards vulnerable road user groups. Participants commented that they would like respect and appreciate empathic attitudes, which facilitate travel with dignity. They attributed the lack of programs that raise awareness as one reason for ignorance among the general public towards disability. Appropriate representation from older people and people living with disability at local and national committees and in official programs of national events would contribute to closing the gap between population groups. Participants advocated for a more interactive approach where older people and those living with disabilities are directly involved in the planning and development of measures to improve public transport.

The overall findings of this study demonstrate that inequities in access to transport and mobility amongst older people and people with disabilities are associated with barriers embedded in the built environment and transport infrastructure including public transport vehicles and services. Social exclusion, including reduced opportunities for meaningful social participation amongst participants, was exacerbated by poverty. These findings support the arguments by Lucas (2012) that transport disadvantage is multi-dimensional and must be understood as located both within the individual who is affected and in the circumstances of processes, institutions and structures within wider society.

It is widely acknowledged that improvements to road networks and infrastructure, particularly design standards that consider the safety of all road users, are critical to ensuring safe and accessible transportation. While the implementation of this road safety pillar remains challenged in many parts of the world (World Health Organization, 2018), road designs features that enhance the safety and mobility of people who are older or living with disabilities include tactile paving, curb ramps, connected routes, information and signage in various formats (Braille, audio), flat and wide walkways, pedestrian and traffic segregation, and seating and lavatory facilities in their road engineering in order to increase independency and well-being of older people and people with disabilities (Bennett et al., 2009; Burton and Mitchell, 2006; Newton et al., 2010; Parkin and Smithies, 2012; Ståhl et al., 2013). While the introduction of lift-equipped buses improved access to transport and mobility of people living with disability in Mexico, however, the implementation of this strategy in South Africa, India, Malawi and Moambique was challenged because of the associated high cost (Venter et al., 2003). Studies conducted in Britain and Hong Kong have shown that public transport concession fare schemes can significantly improve the mobility of older people (Baker and White, 2010; Wong et al., 2018). In India, modifications to vehicle accessibility in response to user suggestion have resulted in positive life changing opportunities for many people with disabilities (Agarwal et al., 2010). Likewise, a partnership with people with disabilities in road planning process has resulted in notable progress in implementing a disability-inclusive transport system in Papua New Guinea (Whitzman, 2015).

#### 4.2. Strengths and limitations

The focus group discussions provide insights into complex social processes related to safe and accessible transport, transport equity and their interrelations that would not be visible in data collection methods such as travel surveys. The composition and heterogeneity of participants in terms of age, gender, type of disability and roles in community committees within and between the eight focus groups provide diverse experiences, beliefs and values related to safe and accessible transportation shared by older people and people living with disabilities. The lead author shared a common language, social traditions, and an understanding of cultural norms with participants that facilitated the articulation and interpretation of verbal and visual cues.

Nevertheless, some limitations of the study need to be acknowledged. The participants were self-selected from local elders or disability committees and institutions. This selection approach omitted the perspectives of those who did not attend these meetings or institutions, and who may also be impacted by travel constraints. The focus group discussion about the experiences of students with hearing impairments was conducted by recruiting their parents/guardians as proxy participants, as VT is not conversant with sign language. It is plausible that views of proxy participants, who are neither disabled nor old-aged, influence their translations. Lastly, we were acutely aware of the nature of inequitable power relations between ourselves and most participants, and we were mindful of the challenges related to focus group moderation, data translation and interpretation processes.

#### 4.3. Implications for policy, practice and research

The study findings indicate the need for a national policy to establish an age- and disability-friendly transport environment and an inclusive action plan. Ensuring that older people and people living with disability have a meaningful voice in the process, will help yield safe and accessible transport systems for all. Potential interventions to address the inequitable transport conditions could include national policies on modification of public transport vehicles such as public buses to age- and disability-friendly models. Sustained enforcement is a crucial element to achieve high compliance with legislation, and recently the government of Sri Lanka has taken several steps such as implementing more rigorous traffic monitoring and steep penalties for infringement.

There is a need for awareness programs that aim to enhance public knowledge and awareness regarding the transport needs and rights of older people and people living with disabilities. Prioritising inclusive transportation in the political agenda is equally important in achieving safe and accessible transportation for vulnerable road user groups. The current transport policy approaches are largely demand-based in Sri Lanka. To make a trade-off between efficiency and equity based approaches is a challenge faced by LMICs with limited capital and resources such as Sri Lanka.

In Sri Lanka there is a paucity of data on travel patterns, related behaviours and cultural norms, and impact on the quality of life and well-being of older people and those living with disabilities. Therefore, more research focusing on these populations could direct transportation research towards people with the highest needs and who are most likely to be able to benefit from safe and accessible services. Additionally, future research is needed to consider an economic analysis of current practices in road development, transport

services and burden on health care systems and families to identify the feasible priorities to be invested to serve the most needed.

### Author statement

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### Declaration of competing interest

The authors declare no competing interest.

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