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**To cite this article:** Preeti Gautam, Anish Khadka, Obindra Chand, Manish Prasai, Sunil Paudel, Sunil Kumar Joshi, Julie Mytton & Emer Brangan (27 Apr 2024): Facilitators and barriers to inclusive and safe mobility on urban roads in Kathmandu, Nepal: a participatory research study, *Disability & Society*, DOI: [10.1080/09687599.2024.2331728](https://doi.org/10.1080/09687599.2024.2331728)

**To link to this article:** <https://doi.org/10.1080/09687599.2024.2331728>



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Published online: 27 Apr 2024.



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## Facilitators and barriers to inclusive and safe mobility on urban roads in Kathmandu, Nepal: a participatory research study

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### ABSTRACT

Research suggests that the built environment and transport services affect the health and well-being of people with a disability. In Nepal, there is limited evidence describing the safety of road users in transport environments. The perceptions of safety in people with a disability while travelling across urban centres in Nepal is unknown. We explored the experiences of people with a disability regarding their mobility and identified facilitators and barriers to achieving safe and inclusive travel in Kathmandu. We used video-elicitation interviews with seven people with a disability and interviewed five advocacy practitioners and five decision-makers. All participants considered poor road conditions and transport infrastructure, and drivers' speeding behaviour hindered their ability to travel safely. The absence of coordination between government agencies and disability-friendly infrastructure standards was the major reason impeding inclusive and safe travel. Our study suggests that the key issue to be addressed is the implementation of existing policies.

### ARTICLE HISTORY

Received 26 January 2023  
Accepted 10 March 2024

### KEYWORDS

Inclusion; mobility; road safety; disability; Nepal

### Points of interest

- This study explored the views of people with a disability, advocacy practitioners, and decision-makers regarding the safety of road environments in Kathmandu, and the actions that could improve safety for all road users.
- We used video footage, filmed by people with a disability, to enable them, and advocacy practitioners and decision-makers to engage on the topic.

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- Traffic and the physical road environment, the behaviours of drivers, and street vendors hindered mobility and increased the risk of injuries for people with disability.
- Implementing/enforcing existing policies would be the first step to make the road environments safer—and more inclusive—for all road users.

## 1. Introduction

Road Traffic Injuries (RTIs) are a global public health concern resulting in 1.35 million lives lost per year (WHO 2018). About 90% of deaths and disabilities due to injuries occur in Low- and Middle-Income Countries (WHO 2018). A common feature in low- and middle-income countries is mixed traffic, where pedestrians, vehicles, and bicycles share the same road space, with little or no infrastructure designed for pedestrians, and low compliance with traffic laws (WHO 2013). These aspects pose safety challenges for all road users, particularly pedestrians with different characteristics, capabilities, and needs (such as young or elderly, pregnant, or having long or short-term impairments). The World Health Organization (WHO) defines the term ‘pedestrian’ as including those using ‘various modifications and aids to walking, such as wheelchairs, motorized scooters, walkers or canes’ (WHO 2013). More than one-fifth of RTI fatalities worldwide are reported to involve pedestrians, rising to more than one-third for low-income countries in the South-East Asia region (WHO 2013).

In 2016, in Nepal, pedestrians, cyclists, and motorcyclists constituted around 72% of all deaths due to RTIs, with pedestrians accounting for half of these (The World Bank 2020). In the same year, transport injuries were the second leading cause of death among men aged 15–49 in Nepal. RTIs alone contributed 36% of all the injury-related disability-adjusted life years in Nepal in 2017 (Global Burden of Disease 2017; Pant et al. 2020). Added to this burden are injuries sustained in road environments without the involvement of road traffic—for example, trips and falls due to uneven surfaces. Unfortunately, disaggregated data on these types of injuries are unavailable in Nepal. Urban road environments in Nepal present a range of injury risks that are both predictable and modifiable (Mytton et al. 2019). These risks affect all road users, but people with a disability are disproportionately affected, resulting in an unequal risk burden (WHO 2011). Improving road safety while ensuring the needs of those most exposed to risk are met is fundamental to achieving Sustainable Development Goal 11.2, which aims to provide access to safe, affordable, accessible, and sustainable transport systems for all (United Nations 2015).

Inclusive safe mobility—defined as ‘the ability of a person to safely and reliably access their preferred destination by navigating an environment that

considers [their] needs and preferences' (Humanity and Inclusion 2018)—plays a crucial role in each person's right to live an independent life in their community. However, unsafe built environments and perceived injury risks can limit participation and access to activities and services, such as education, employment, healthcare, and emergency and disaster response; leading to a decline in quality of life, functional independence, and physical and mental health (Polders et al. 2015).

There is an increasing body of evidence describing the experience of people with a disability as they navigate their environments. In this evidence, the effects of various forms of pavement/road obstruction on the mobility of people with a disability is a common theme. A systematic review by Bigonnesse et al. (2018) highlighted that uneven or narrow sidewalks and rough pavements were the most reported barriers among people with a disability. In addition, the high volume of vehicles and pedestrians posed difficulty during mobility among people using assistive devices, such as wheelchairs and/or white canes or crutches (Bigonnesse et al. 2018). Mahmood et al. (2020) also identified that temporary and permanent obstruction of the sidewalks and streets hampered mobility among people using such assistive devices. Permanent obstructions, such as trees, lamp posts, fire hydrants, and temporary obstructions, such as garbage bins, parked vehicles, or road constructions caused discontinuity in the path requiring frequent re-routing. In addition, café outdoor furniture and sandwich boards posed problems for mobility (Harris, Yang, and Sanford 2015; Rosenberg et al. 2012). Maart et al. (2007) found that the mobility and accessibility issues are particularly prevalent in urban areas which have a more built-up environment. Most of this research was conducted in high income countries, and therefore whilst helpful, the findings may not be transferrable to a context, such as Nepal.

Nepal ratified the Convention on the Rights of Persons with Disabilities and the Optional Protocol to the Convention on the Rights of Persons with Disabilities in December 2009 (Banskota 2015). Policy provisions and legal frameworks have set out the rights of people with disability to equal access to physical infrastructure and road spaces in Nepal (Government of Nepal 2006, 2015, 2017; United Nations 2006). However, the implementation of these rights remains weak. People with a disability in Nepal continue to experience stigma and exclusion in many aspects of their lives (Chand 2021). An accessibility audit of 150 public infrastructure sites in Kathmandu, published by the National Federation of the Disabled–Nepal (NFD-N 2018), showed that of the 13 audited sites taken from the transportation sector, none were found to be adequately accessible for people with a disability.

Research regarding mobility among people with a disability is growing. However, there is little evidence to understand their journey and experiences in the road environment (Kett, Cole, and Turner 2020) including in Nepal. This has made it difficult for planners and decision-makers in Nepal to understand

the key concerns and issues of people with a disability, and to determine where and how to invest in making the road environment safer and more inclusive. Therefore, in this study, we aimed (i) to explore the perceptions and experiences of mobility in urban road environments among people with a disability residing in Kathmandu, (ii) to identify facilitators and barriers to the achievement of inclusive, safe mobility in Kathmandu, and (iii) to use the data generated by people with a disability to engage advocacy practitioners and decision-makers with this issue and describe their perceptions of barriers and opportunities for change.

## **2. Methods**

### **2.1. Study design**

We conducted a qualitative study using participatory research techniques to interview three groups of participants (i) people with a disability with or without the support of a caregiver, (ii) advocacy practitioners, and (iii) decision-makers. Using participant-centred methods, we provided each person with a disability with choices regarding how they contributed their data and provided tailored support to each individual (Bourke 2009). We used video-elicitation techniques as videos offer people an opportunity to illustrate their experiences and make their experiences available to others (Rojas and Sanahuja 2012). Liebenberg (2009) argues that using images as a discussion tool can increase participant control over the research process and improve the contextual accuracy and relevance of the data. Anonymised extracts of the material generated by people with a disability were presented to the advocacy practitioner and decision-makers during their interviews, with the aim of engaging them with specific local examples of the issues, and to gather their perspectives on barriers and facilitators to change.

### **2.2. Setting and participants**

The study was conducted in the Kathmandu valley of Bagmati Province, which has the highest proportion of people living with a disability in Nepal (Central Bureau of Statistics 2012). Kathmandu Valley is also the hub for opportunities, having the three busiest cities with modern transport infrastructure. However, a recent accessibility audit identified extensive mobility and access issues on urban roads, bus stops, and parks in Kathmandu Valley (NFD-N 2018). With the audit report highlighting the challenges of the transport system in Kathmandu and past literature reporting the reluctance among people with a disability to use such urban spaces (Lid and Solvang 2016), we thus choose urban road environments in Kathmandu Valley as an appropriate location for our study.

We recruited adults (18+ years) who identified as having a disability, using the WHO definition (WHO 2011). Given the small sample feasible in this exploratory study, we were aware that not all disabilities would be represented. Where a participant with a disability required the support of an assistant (e.g. family member/carer) to facilitate their participation, the assistant was formally included as a participant, including formal consent procedures. We interviewed advocacy practitioners and decision-makers as key informants. The criteria for inclusion as an advocacy practitioner was anyone with experience working in a professional or voluntary capacity to advocate for the implementation of measures that support the safe mobility of people with a disability in Nepal. Decision-makers included in the study were those whose professional role included making decisions about policy, or implementation of policy, which affects the design, construction, maintenance, or regulation of urban road environments in Kathmandu Valley.

### **2.3. Data collection**

We worked with the National Federation of the Disabled-Nepal (NFD-N) to recruit potential participants with a disability, as well as key informant participants. Existing networks across the road safety sector were used to identify potential participants involved in decision-making. Potential participants were invited to pass information about the research to other eligible individuals in their networks (snowball sampling). Potential participants who expressed an interest in taking part were contacted by PG and provided with information about the study in Nepali. This information was provided accessibly as appropriate to each individual's needs—for example, using *Unicode* font for Nepali typing as this was more accessible for people with a vision impairment on their technology, such as laptops and mobiles. Participants were given the opportunity to consider this information and ask any questions they had about the study, before deciding if they wished to participate.

Two researchers (PG and AK) supported the participants in generating their data. The researchers consulted the participants with a disability regarding their needs and preferences. For example, the need for a caregiver (personal assistant/family member) and/or a specialist, such as a sign language interpreter. Once needs and preferences were identified, informed consent was taken from the participants.

For participants with a disability, the study also included participants who, under Nepali legislation, would be considered unable to provide informed consent due to 'physical or mental incapacity' (Nepal Health Research Council 2019). In these circumstances, under National legislation, 'permission from the responsible relative replaces that of the subject'. Informed consent was thus secured from the 'responsible relative', alongside assent from the person they were representing. This included consent for

the 'responsible relative' to participate in an individual interview, where appropriate.

For in-person data collection, written consent was taken, apart from one of the vision impaired participants who chose audio-recorded consent. The consent for all the online interviews was audio-recorded.

For the video data, at the time of initial consent, participants with a disability agreed to allow anonymized video data they provided to be considered for illustrative use in study outputs. Before the use of excerpts of video data in key informant interviews, the research team sought verbal confirmation of consent from the participants in relation to the specific excerpts selected.

Before participating in a semi-structured interview, participants with a disability were offered the opportunity to use a body-worn camera to record and capture elements of their journeys in urban road environments which they considered relevant to the research topic. Body-worn cameras have been widely used for research among people with a disability and found to be both feasible and acceptable (Bonehill, von Benzon, and Shaw 2020; Pearce 2012). The data from each participant with a disability thus consisted of their semi-structured interview and demographics; carer interview data where relevant; and any video material the participant had chosen to generate for the study.

Training and support were provided to the participants (including caregivers where relevant) in the use of the camera. A range of accessories was available to allow the camera to be used in a variety of ways, for example, hands-free- attaching the camera to the participant's body or any assistive equipment they used, to safely capture their perspective during their journey. Participants were also free to decline to generate video data and to instead describe their journey experiences narratively during a semi-structured interview. Interviews were arranged at a time and place (or online) which were convenient for the participants.

Video data were transferred securely to a tablet computer for in-depth discussion during the subsequent semi-structured interview. The timing and location of the semi-structured interviews were negotiated with each participant and took place ~1 week after they created the video. Interviews were conducted in a quiet place feasible for both the participants and researchers. Two researchers (PG and AK) conducted the interviews; PG led the interview while AK wrote notes during the interview. We used a topic guide flexibly during the interviews to ensure key topics were covered while also allowing participants to introduce any issues of salience to them that were unanticipated by the researchers.

For the key informants, face-to-face or online interviews were offered according to participant preferences as well as in accordance with restrictions on face-to-face contact imposed by the COVID-19 pandemic at that time. For all face-to-face study interactions, researchers maintained social

distancing, used face masks as appropriate, and cleaned their hands regularly. Separate topic guides, informed by a review of the literature, were developed by the multi-disciplinary research team for both advocacy practitioners and decision-makers. With explicit consent, excerpts of the video data generated by the participants with a disability were anonymized and shared with the decision-makers and advocates as prompts for discussion during the semi-structured interviews. Participants were offered 1200 Nepali rupees (~£8) as a token of appreciation for their time and participation. The participants with a disability were offered twice this—in recognition of the additional time to capture video of their journeys as well as taking part in an interview.

#### **2.4. Data analysis**

The audio recordings were transcribed verbatim in Nepali, de-identified, and translated into English. To ensure the quality of information, the transcripts and translations were cross-checked by a researcher. To support robust analysis two of the transcripts were double-coded by PG and AK. The codes of the two researchers were compared for consistency and any non-concurrence was resolved through discussion before agreeing on the coding framework (O'Connor and Joffe 2020). The coding frame was then applied to the remaining transcripts. The coding frame was continuously revised with the development of new codes. Similar codes were grouped into broader categories and discussed with the wider team to develop the final themes. The interview data were analysed using thematic analysis, as described by Braun and Clarke (2013), employing a data-driven inductive approach (Boyatzis 1998). Transcripts were imported into QSR NVivo Qualitative data analysis software to support the management of the coding process and to facilitate robust collation and retrieval of coded data.

The focus of the thematic analysis was the data generated from the interview, with the video data treated as Supplementary Material. The primary role of the video data was to support communication and prompt discussion during the interviews. This recognizes that photographic analysis may not be sufficient to portray the meaning of the photos intended by the photographer (Cannuscio et al. 2009)—or in this case the videographer. In addition, comprehensive videographic analysis was beyond the scope of our study.

#### **2.5. Ethical consideration**

Ethical approval was obtained from the Nepal Health Research Council (Ref: 1930) and ratified by the Faculty of Health and Applied Sciences Research Ethics Committee at the University of the West of England, Bristol, UK (Ref: HAS.21.02.107). We recognize the importance of language and the diversity



of preferences regarding terminology. The UN Convention on the Rights of Persons with Disabilities (2006) uses the terminology 'Persons with Disabilities'. Nepal has signed up to this convention. In Nepal, the disability community highly respects the convention and use the term either 'Persons with disabilities' or 'people with a disability'. We, therefore, have used the term 'people with a disability' in accordance with the preference of the Nepalese Society of Persons with Disabilities.

### 3. Results

#### 3.1. *Participants characteristics*

In March 2021, we generated data sets for seven participants (four female, three male) with a disability—six of these participants completed the interview themselves, and in one case, the interviewee was a male caregiver. Those participants had a physical disability (2), visual impairment (3), hearing impairment (1), or intellectual disability (1). Six participants chose to capture their journey using a body-worn camera and thereafter participated in a semi-structured interview. One participant declined to record her journey because of time constraints but did take part in an interview. The age of participants with a disability ranged between 21 and 37 years.

In April 2021, we interviewed five advocacy practitioners and five decision-makers. The ages of advocacy practitioners and decision-makers ranged from 30 to 49 years and 42 to 55 years, respectively. Three of the advocates described themselves as disabled, while the other two had children with a disability. While these aspects of their identities clearly informed their perspectives, for clarity we refer to them in this text based on their primary role in the study: as an advocacy practitioner. The phrase 'participants with a disability' in this text refers to those participants recruited to contribute data centred around their personal experience of disability. The five decision-makers worked for the federal or local government. They included officers from the Department of Roads; the City Planning Commission of Kathmandu Metropolitan City; Lalitpur Metropolitan City; the Ministry of Women, Children and Senior Citizens; and the Ministry of Physical Infrastructure and Transport.

The interviews for participants with a disability ranged from 31 to 76 min, with an average of 1 h. For advocacy practitioners, the average was 57 min (range from 44 to 69 min), and for decision-makers, the average was 48 min (range from 39 to 70 min).

The thematic analysis led to the development of four overarching themes: Poorly designed and managed roads hinder safe mobility, Accessible information to support safe mobility, Behaviours affecting independent travel, and Failure to deliver potentially helpful policies.

### 3.2. Poorly designed and managed roads hinder safe mobility

The lack of reliably accessible pavements alongside roads was a major issue for participants, hindering mobility and reducing safety.

*Where are we supposed to ride our wheelchairs? There is no accessible pavement for us. ... I feel scared to ride on the main road. Some of my fellow wheelchair users have been hit by the vehicle while riding on the main road. But there is no point in restricting our movement out of fear of getting hit by a vehicle, right? **P2, Wheelchair user***

Participants highlighted many factors contributing to this issue—in some cases, there was no separate pavement provided at all, or the design of the pavement was intrinsically inaccessible. One advocacy practitioner complained of narrow pavements with widths of less than one foot. Another design issue mentioned was a lack of ramps to allow access on and off pavements.

Where pavements existed, these were often being used for other purposes—for example, by street vendors, motorbike parking, or storage of construction materials. Video and interview data illustrated that many vendors placed their merchandise/stalls on the pavement, reducing walking space, and sometimes forcing the participants into the main road. Vision-impaired participants spoke about having to reduce their walking pace to navigate past haphazard construction materials piled up on the pavement. One participant spoke about feeling he needed to rush to make up for this lost time—and how once it resulted in a fall because he did not notice another hazard (Figure 1).

*Yes, my speed reduces because of the disturbance caused by the construction materials on the road, due to which I hurry so much, thinking I might be late. Since I was in a bit hurry during the time, I ended up falling inside the manhole, and I couldn't recognize the manhole with the stick. **P4, Vision- impaired***



**Figure 1.** Construction materials piled up on the pavement blocking the stairs—an excerpt taken from the video of P4, vision-impaired.

More permanent fixtures, such as trees and utility poles (electricity and telegraph poles) also caused obstructions. Four advocacy practitioners and three participants with a disability raised concerns about these, with the issue featured in the videos captured for the study. These hazards predominantly affected people with vision impairment as they described instances of being injured. For example, one participant with a vision impairment reported having a swollen forehead when he bumped into the tree growing across the path at head height, as his stick did not detect any obstruction at ground level (Figure 2).

*In Ratnapark (main town), there are trees on the pavements. There is no point in placing tactile pavements when a tree is ahead of it. We also have a video [referring to the video taken by participants with a disability] where a visually impaired person is walking, and he walks into the tree. **A1, Advocacy Practitioner, Physical Disability***

Participants recognized functions, such as vehicle parking, street vendors making a living, etc. as important, but wanted ways to be found to facilitate them without compromising the pavement's mobility function. One of the vision-impaired participants urged municipal authorities to construct underground parking, although he thought that people's unwillingness to pay for the parking could be a problem. With street vendors, many participants with a disability acknowledged this could be an important source of earning—one participant suggested allocating dedicated space for the street vendors where they could sell their products:

*.... there is no appropriate space for them [street vendors]. There is no mechanism to monitor and control that. For example, if we knew that a particular place was indeed allocated for street vendors, then we would be alerted. If they are given such spaces, it would be very convenient for us to move around. **P3, Vision-Impaired***

All the participants with a disability noted an intervention intended to support inclusive mobility—tactile paving. This is a textured ground surface indicator to help pedestrians who are vision-impaired know that they are walking in a safe area. The participants said that the tactile paths were useful to increase their confidence in walking independently. However, they did not think there were sufficient tactile paths and noted that even where tactile



**Figure 2.** Trees and poles on the pavement causing obstructions—an excerpt taken from the video of P3, vision-impaired.

paths were provided, there were sometimes issues with them. They complained that tactile pavements were not continuous or the surface was disrupted, either due to potholes or because of construction materials piled up on the pavement, and also that most tactile pavements ended abruptly at a wall. Because of this, vision-impaired participants reported that they lost their direction frequently.

*One of the errors is that the ending points of the tactile [paving] are directed towards the wall when they should continue in a straight line. And there are also gaps where the roads have been dug up. Sometimes when walking on those lines [referring to tactile pavement], we lose track of them despite following them correctly. **P3, Vision-Impaired***

One of the researchers asked about changes in the tactile paving designed to warn the visually impaired road user of an approaching hazard—which he had seen in the video taken by one of the vision-impaired participants. However, the participant stated that he had never encountered such infrastructure. This suggests that this feature of tactile paving is not working well for vision-impaired people—either not always present where they should be or not recognizable/understood. This highlights the lack of disability considerations in infrastructure programs as well as the lack of awareness regarding mobility provisions among people with a disability.

Participants also found themselves sharing urban roads with stray animals, especially dogs, and this could be another source of anxiety. Four participants (two advocacy practitioners and two vision-impaired participants) raised this concern and noted that stray dogs seemed to respond aggressively to the tapping of a white cane, sometimes attacking the user. Another risk for those with vision impairments was unintentionally stepping on a dog and getting bitten.

*I use [a] white-stick while travelling, and dogs tend to react to the white stick. The dogs once attacked me and ripped my pants (laughs); luckily, they didn't bite me. **P4, Vision impaired***

### **3.3. Accessible information to support safe mobility**

Along with accessible infrastructure, many participants with a disability and advocacy practitioners highlighted the importance of adequate information and communication to help them plan their daily journeys.

*The main point is that when it comes to mobility, it is not only about the physical and architectural structures. We need access to information and communication as well. **A12, Advocacy Practitioner***

For example, people needed advanced information to allow them to make adjustments if maintenance or construction works were going to affect their usual routes:

*Similarly, regarding communication barriers, in many places, the roads are perfectly fine till the previous day, but they have been demolished the next day. But the notice for that is not issued on time. And that kind of information must be circulated as symbols for deaf people. Similarly, it must be circulated in an illustrative form for people with intellectual disabilities and autism. Lack of circulation of such notice on time impedes safe mobility. **A3, Advocacy Practitioner***

One of the vision-impaired participants described an incident where a truck almost hit him when he had to walk on the main road because of some construction activities on the pavement. He said that had there been information regarding the construction activities on the pavement, he would have taken an alternative route and perhaps been safe.

Another important type of information was that which supported people to safely use infrastructure, such as pedestrian crossings, and services, such as public transport. Such information often relied on particular types of technology being in place, well-designed, and working. Very few public buses have automatic bus location announcement and display systems in Nepal. Most of the advocacy practitioners and two visually impaired participants emphasized the need for such systems since it could improve accessibility for people with different types of disabilities. However, one participant with a hearing impairment said such information, when available, is not of help if it is only displayed at the front of the bus and is obscured by standing passengers. More so, the issue existed due to buses generally operating over capacity and with most passengers standing.

*... it is not easy because the bus is very long and there will also be many people on the bus. Due to that, we cannot see the name of the places. So, it isn't easy. **P6, Hearing impairment***

Likewise, there are very few pedestrian crossings in Nepal that have audio support. The majority of the participants acknowledged the importance of audio support in pedestrian crossings.

*We discuss that; even the traffic light needs to be friendly to visually impaired people. When there are no such signals at the traffic junction, visually impaired people have many difficulties at the pedestrian crossing. If we keep sounds in the traffic lights, then it will be helpful for everybody. However, it is not as easy as we say. **D4, Lalitpur Metropolitan City***

However, technological solutions, such as audible signals at crossings do not work in isolation—as described in the next section, if drivers do not yield at such crossings, the signal does not guarantee it is safe to cross.

### **3.4. Behaviours affecting independent travel**

Most participants with a disability complained that the drivers do not yield to pedestrians at crossings. While this is a problem for all pedestrians, those

with vision impairment are particularly affected as they cannot see the approaching vehicle. Participants with a disability, including the advocates, expressed how scared they are when they cross the road.

*I get scared, thinking, what if I get hit by a vehicle upon attempting to cross the road on my own? So, I wait for someone to come to help me as I love my life. Additionally, we cannot recognize pedestrian-crossings, and even though we identify the pedestrian-crossing, there is no practice of slowing down on the pedestrian-crossing due to which I am even scared when it comes to crossing the road. **P4, Visually-Impaired***

Major general road safety issues, such as speeding, were noted by participants, with several advocating stricter enforcement of traffic rules, both for pedestrians and drivers. Participants often went on to describe how such issues affected them personally. Two people with physical disabilities expressed their fear because of the vehicle's speed, especially the trucks, tippers and micro-buses, which they saw as always in a hurry, and not being driven with consideration for other road users (Figure 3).

*If the trucks, tippers, or big vehicles have come, I stay at a distance and let the vehicles pass because they are mostly speeding. If the private cars are coming, they consider us and approach at slow speed as they can see we are waiting. **P1, Physical Disability***

Another issue was discrimination against people with a disability on public transport. The participants with a physical disability and vision impairment described various incidents where wheelchair users or visually impaired people were refused boarding on a public vehicle. The participants believed that bus drivers did this because they think that wheelchair users take up more space on the vehicle and have to be lifted in and out, and visually impaired users take extra time to board and leave the bus. Two participants with vision impairment further highlighted the problems created when the drivers do not stop their bus at the designated stop. This sometimes creates confusion and they lose of how far they have travelled along their routes. Hence, one



**Figure 3.** Mixed traffic—an excerpt taken from the video of P1, physical disability.

of them recommended training the drivers and conductors on the needs of people with a disability so that they are sensitive to such needs.

*One important thing that needs to be done is training the staff of the vehicle, including both drivers and conductors. They should be well-trained so that they will stop their vehicles at the designated station, and allow adequate time for passengers to get on and off the vehicle comfortably. **P4, Visually-Impaired***

### **3.5. Failure to deliver potentially helpful policies**

Three of the advocacy practitioners acknowledged that frequent changes in Government in the recent past had hindered the implementation of agreed policies. These participants recognised they had to repeatedly make efforts to advocate for the issues of those with disabilities, and that the plans and policies formulated by the past decision-makers (or governments) were not followed through by newly elected ones. This hindered the implementation of processes and their effectiveness.

*.... but our bureaucracy is so unmanaged. The person in the position will just have started to understand it [Refers to the issues that people with a disability put forward], and then the staff gets transferred to another place. We must coordinate with the new Government and start from the zero level again. And sometimes the situation will be very upsetting. **A2, Advocacy Practitioner***

One participant from the Department of Roads highlighted that the introduction of a federal system of Government in Nepal resulted in ambiguity on which level of government was responsible for constructing and maintaining urban roads. The local government does not address the issues because the responsibility and budget have not yet been handed to them, and the Federal Government does not either because it is not their responsibility.

*Our main responsibility is highways. For the time being, we have also been doing maintenance of the urban roads, which is temporary. It is not our long-term responsibility. When Metropolitan Cities are capable (when they are enabled), then we will not look after the urban roads. **D1, Department of Roads***

A participant from the Ministry of Physical Infrastructure and Transport reported that the Government is more focused on accessible buildings than accessible road infrastructure. He observed that due to the lack of priority, the opportunity had been missed to construct new roads as disability-friendly. The participant from the Department of Roads reported that the Government lacks agreed standards for disability-friendly infrastructure and that any currently available infrastructure tends to have been built based on the decision-makers exposure to overseas approaches to improving access.

*But many offices are not disabled-friendly physically and structure-wise. Because of that, the Government is also focused on accessible buildings. We are pretty backward in*

*having a disabled-friendly transportation system. However, we will cover these issues with their rules and guidelines in the upcoming law. **D5, Ministry of Physical Infrastructure and Transport***

*.... actually, we don't have any standard on how disability-friendly [roads] should be. So, standards should be made on what type of pavement is needed, and what kind of tactile [paving] is required. Such a standard has not been made in Nepal. This infrastructure has been implemented only because of seeing and learning such things in foreign countries while going there. We haven't met the standard. **D1, Department of Road***

Lack of coordination between government departments, such as those responsible for roads, electricity, drinking water, sewage, etc., was cited as one of the significant gaps in implementing disability-friendly policies by both the advocacy practitioner and the decision-makers. The participant from the Department of Roads further added that there is a practice of informing rather than coordinating. For instance, if an electricity pole has to be put on a new road that has been constructed, then the Department of Electricity informs the Department of Roads that they are installing electricity poles. But they do not coordinate to minimise the disruption to road users. He further perceived that the public is less concerned about the poor road conditions as compared to the disruption of utility services, such as internet, electricity, and water supply. He considered utility services are reported more often than the issues of poor road conditions, creating low pressure on the Government to improve road infrastructure.

All the participants with a disability and advocacy practitioners complained that, though their voices are heard while making the policy, they are seldom implemented. The decision-makers also acknowledged the lack of implementation of policies.

*The leading organisation for people with a disability is the National Federation of the Disabled, Nepal (NFD-N). So, in that relation, whenever there are any issues regarding people with a disability, the NFD-N is called upon as it is the umbrella organisation. **A9, Advocacy Practitioner***

*Nepal ratifies most of the global conventions. But implementation is weak. Though we have several guidelines, regulations and systems, their implementation is a huge problem. **D5, Lalitpur Metropolitan City***

#### **4. Discussion**

We used a video elicitation technique to explore the perceptions and experiences of mobility among people with a disability residing in Kathmandu. The videos generated were presented to the advocacy practitioners and decision-makers to gather their perspectives on barriers and facilitators to inclusive, safe mobility in Kathmandu, Nepal. In this study, we focused on safety from the perspective of avoiding unintentional injuries whilst travelling.



The narratives from this study suggested that the pavements in Kathmandu were usually very narrow and irregular, which discouraged people with a disability from moving freely. Several studies have reported uneven or narrow pavements as barriers to safe mobility among people with a disability (Fomiatti et al. 2014; Korotchenko and Hurd Clarke 2014; Rosenberg et al. 2012). Studies in high-income countries have also reported that temporary obstacles, such as café outdoor furniture and sandwich boards obstructed people with a disability from getting around with an assistive device (Harris, Yang, and Sanford 2015; Rosenberg et al. 2012). Café outdoor furniture and sandwich boards are not common in Nepal. However, participants in this study did talk about street vendors, parked motorbikes, and construction materials piled up on the pavements causing obstructions for people with a vision impairment. Unlike the wheelchair users in the study conducted by Harris, Yang, and Sanford in the United States (2015) reporting obstructions on the pavement, the wheelchair user in this study did mention obstruction but focused on the fact that most of the pavements in Kathmandu were inaccessible due to the lack of a ramp and thus they were forced to use the main road, which they considered dangerous (Rosenberg et al. 2012).

In a multi-country study by Manduchi and Kurniawan (2010), among 307 vision-impaired people, 86% reported having head injuries caused by bumping against unexpected obstacles, such as trees, utility poles, and construction materials. These findings are consistent with our study, where the visually impaired participants reported similar experiences. In addition, trees along the road have also been reported to reduce the visibility of approaching vehicles (Gautam et al. 2021). Tactile pavements are designed to assist visually impaired people, helping them safely and efficiently navigate public spaces. Our data (video and interview) suggest the need to implement more tactile pavements, with better maintenance, supported by the provision of training regarding tactile surface indicators to people with vision impairment.

Participants in our study mentioned drivers' behaviours impeding independent travel among people with a disability. The participants reported being declined access to public transport as they had to be lifted onto buses or would occupy extra space for their assistive devices on buses. This is consistent with the finding by Kleinitz et al. (2012) in Cambodia. Similar to the results of this study, several other studies conducted in Nepal report speeding as a major cause of road traffic crashes (Joshi et al. 2022; Khadka et al. 2021; Pandey et al. 2022). The participants in our study were scared more by the drivers of trucks and tippers as they seemed to always be driving at speed. A qualitative study among truck drivers and transportation entrepreneur association members by Khadka et al. (2021) found that low wages and trip-based payments motivated the drivers to engage in excessive speed. This highlights the need to understand different road user groups' perspectives when trying to formulate solutions to make the roads safer. In this study,

participants frequently mentioned that the enforcement of traffic rules was not strict. Enforcing the traffic rules would make the roads safer for everyone, including those with disabilities.

A sustainable transportation policy should consider the population's diverse mobility needs. For this, decision-makers need to be more aware of the issues affecting people with a disability when designing roads and travel infrastructure. Providing people with a disability with a voice when making new plans and strategies makes the policy become technically robust and gains legitimacy. The advocacy practitioners and decision-makers in our study emphasised that the main problem is the failure to implement existing policies adequately. Lack of leadership and limited budgets are identified as significant challenges to the implementation of policies (Campos and Reich 2019). In addition to this, participants in this study frequently mentioned the lack of agreed standards for disability-friendly infrastructure and how this hindered safe and inclusive travel in Nepal.

Safe and accessible mobility is a human rights issue. If systems are accessible and safe for everyone, they will be accessible and safe for people with a disability. The 'safe system' approach to road safety acknowledges that humans make mistakes on the road, but these should not lead to deaths or severe injuries. This approach demands shared responsibility among multiple parties for reducing road trauma. The system thinking approach shifts the focus away from blaming road users to making a safe traffic environment (OECD 2016). Although Nepal has signed up for the second decade of action for road safety (UN General Assembly 2020), it is still lagging in implementing actions and sectors are not yet working together (Pandey et al. 2022). Decision-makers in our study suggested poor multi-sectoral collaboration as a key contributing factor to the lack of a safe transportation system, including for people with a disability.

#### **4.1. Strengths and limitations**

To our knowledge, this is the first qualitative study to investigate the experiences of people with a disability on their day-to-day travel in Kathmandu and to explore the facilitators and barriers to achieving inclusive, safe mobility in urban areas in Nepal. During the design of this study, the research team consulted a range of stakeholders, and the views provided have informed every detail of our plans. The involvement of researchers from different disciplines and professional backgrounds (public health and engineering) in generating and coding the data helped us to collect and interpret the qualitative data from diverse perspectives. We used an innovative technique to facilitate the engagement of people with a disability in a research project and enabled them to express their views on safe, accessible, and inclusive transport. Their experiences were available to others through the use of film

and helped the researcher to engage with advocates and decision-makers during interviews. The video data was evidence of road safety issues which the decision-makers could not deny. Engaging decision-makers with this issue was in fact one of the key challenges highlighted by stakeholders when planning this study.

The participants with a disability were asked to take part twice in this study- first to record their journeys using a body-worn camera and then take part in an interview afterwards. The process could have been time-consuming for the participants in the study. In our study, one of the participants declined to record her journey because of a lack of time. Yet, the remaining participants with a disability were all interested in taking videos and talking about them. Also, the involvement of caregivers in the study also enabled the involvement and participation of people with a diverse disability. Therefore, we believe that other research looking to engage people with a disability could employ this method equally successfully. As this was an exploratory study, we had a relatively small number of participants overall, and many disabilities were not represented. Future studies could include a larger sample, with greater diversity regarding age and other characteristics, to yield additional information. This study was conducted in urban road environments and thus the findings cannot be assumed to be generalisable across the country, especially for rural road environments in Nepal.

#### **4.2. Conclusion and recommendations**

The involvement of people with a disability in studies to create an inclusive and safe road environment is rare. The video elicitation technique was an engaging method that encouraged people with disability to voice their concerns about their journey and how it could be made safer and more inclusive. The participants provided stories of how their mobility and safety were hindered by the street vendors, construction materials piled up, and motorbikes parked on the pavement. People with vision impairment also added their experiences on how unsafe the roads of Kathmandu were due to poorly placed or maintained trees and utility poles on the pavement. The participants with a disability and the advocacy practitioners described the danger and their fears to cross the road because of the driver's behavior of not yielding to the pedestrians at crossings and their behaviour of speeding. This not only puts people with a disability at a higher risk of road traffic injuries and crashes but also curbs their social and public participation. Our findings add strength to the calls for a collaborative effort to make travel safe, easy, and inclusive for everyone, irrespective of one's abilities. Participants in the study demanded that decision-makers implement existing policies to make society inclusive, accessible, and more importantly, a livable place for all.

Based on the findings from our study we recommend:

- The needs of people with a disability should be considered when managing, as well as designing, roads, roadsides, and pavements. For example, construction materials should not be dumped on pavements or street vendors should not block the pavement.
- Adherence to the UN conventions that the Government of Nepal has already signed up to.
- Enforcement of existing traffic legislation to manage the speed of the traffic on the road and to ensure adherence to rules about stopping at pedestrian crossing points.
- Improve use of technology to provide people with a disability with information so that they can plan their journeys and travel with greater confidence.
- Future studies should consider using video-elicitation as a tool to facilitate amplifying the voices of people with a disability.

## Acknowledgments

We would like to thank all those who agreed to participate in the study and share their knowledge for the purpose of this study. We acknowledge all the caregivers supporting the participants to capture their mobility on the urban roads in Kathmandu through the use of a body-worn camera. We thank Ms. Rama Dhakal from the National Federation of the Disabled-Nepal (NFDN) for helping us with the translation during the interview with a person with a hearing impairment. We are thankful to all the translators who helped in transcribing and translating the audio files.

## Author contributions

PG, AK, SP, SKJ, JM, and EB contributed to the conception and design of the study. PG and EB drafted the protocol design, methods, and data analysis plan with support from AK, OC, MP, SP, SKJ, and JM. PG and AK contributed to data collection. PG led the analysis, interpretation of data, and drafted the manuscript. All authors contributed to subsequent drafts and approved the final manuscript.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

## Funding

This research was funded by the University of the West of England, through their Global Challenges Research Fund Quality Research allocation.

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## Data availability statement

The data supporting the findings of this study are available upon reasonable request from the corresponding author.

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