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Accessibility in Public Spaces for Persons with Disability- A Case of Kathmandu Metropolitan City

by

Kopila Wagle

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DECLARATION

I hereby declare that the thesis entitled "**Accessibility in Public Spaces for Persons with Disability- A Case of Kathmandu Metropolitan City**" submitted to the Department of Architecture in partial fulfillment of the requirement for the degree of Master of Science in Engineering in Urban Planning, is a record of an original work done under the guidance of Prof. Dr. Sudarshan Raj Tiwari, Institute of Engineering, Pulchowk Campus. This thesis contains only work completed by me except for the consulted material which has been duly referenced and acknowledged.

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The undersigned certify that they have read, and recommended to the Institute of Engineering for acceptance, a thesis entitled **"Accessibility in Public Spaces for Persons with Disability- A Case of Kathmandu Metropolitan City"** submitted by Kopila Wagle (074/MSU/008) in partial fulfillment of the requirements for the degree of Master of Science in Urban Planning.

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ABSTRACT

Accessibility is the possibility of circulation and giving equal access to everyone. One of the problems of an urban area like Kathmandu is the inaccessibility to urban public spaces such as sidewalks, bus stops, pedestrian crossings etc. for people with all kinds of abilities. There is a certain group of people in society i.e. persons with disability (PWDs), who often struggle with the complexities of built environment (structural barriers) that hinder their equal participation in daily activities. Due to the ever growing idea of inclusive infrastructure development and thanks to the advocacy of organizations related to PWDs, there is now a realization of the need to improve the understanding of, and eradicate the barriers faced by PWDs when accessing and utilizing public spaces. This research aims to identify the problems and challenges faced by PWDs in using the public spaces of Kathmandu.

A review of literature and existing policies confirms that in the context of Kathmandu, there is a lack of comprehensive and holistic approach to ensuring accessibility for PWDs to public spaces. This research, which is both qualitative and quantitative in nature, takes the stretch area from Sundhara to Ratnapark, a commercial and transportation hub of Kathmandu city as the area of study about accessibility to public spaces- sidewalks, bus stops, pedestrian crossings, foot over bridges/ subways, public buildings and parks. The site area is divided into nine different zones based on land use and a data sheet consisting of date, time and number of persons is prepared to find the frequency of use by PWDs in each zone. Direct observation, questionnaire survey and key informant interviews are used as the tools to collect data and information about the existing condition of accessibility in Kathmandu and compare them against a matrix consisting of parameters of accessibility and universal design principles prepared from a review of international practices that have enabled accessibility.

The findings highlighted in the research point to several issues of urban accessibility in Kathmandu- such as unsafe, overcrowded and encroached sidewalks, hazardous obstructions for PWDs in public spaces, poorly maintained and improperly designed physical infrastructures etc. In addition, it is also concluded that the problems to accessibility seem to arise from the poor implementation of policies, lack of legal framework for planning, implementing and monitoring that accessibility mentioned in policies is ensured in action and a lack of coordination between the various authorities of government who share the responsibility of providing physical infrastructures and services. The current condition of infrastructure development thus, reveals the existence of disparity which essentially affects PWDs' equal right to the city. Some recommendations proposed in the research for making public spaces accessible in Kathmandu are: creation of a strong legal framework for implementing and monitoring the provisions of accessibility, incorporating design standards and guidelines that ensure accessibility in building codes and by-laws, public-private partnership and involvement of PWDs in planning, implementation and monitoring phases of physical infrastructure development and increasing awareness among public for behavioral changes towards the PWDs.

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List of Abbreviations

CBM	Christian Blind Mission
CDC	Centers for Disease Control and Prevention
CPC	City Planning Commission
CRPD	Convention on the Rights of persons with Disabilities
DPW	Disabled Protection and Welfare Regulation
INGO	International Non- Government Organization
KMC	Kathmandu Metropolitan City
MOUD	Ministry of Urban Development
MOWCS	Ministry of Women, Children and Social Welfare
NFDN	National Federation of Disabled – Nepal
NGO	Non- Government Organization
NUDS	National Urban Development Strategy
PWDs	Persons with Disabilities
SOS	Societas Socialis
UNCRPD	United Nations Convention on the Rights of Persons with Disabilities
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNICEF	United Nations International Children's Emergency Fund
US	United States
WHO	World Health Organization

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1 INTRODUCTION

1.1 Background

Nepal is one of the most rapidly urbanizing countries in south Asia (Mugambwa & Katusiimeh, 2018). This trend of rapid urbanization and ever-changing political scenarios has created several challenges to urban development of the country and Kathmandu, its capital, is no exception. Due to unmitigated rural-urban migration into Kathmandu, there is a severe issue of haphazard and unmanaged infrastructure development in the valley. Most of the infrastructures are built post development of settlements in a manner that is far from being well-planned. As a consequence, the valley and its population are deprived of many of the amenities a modern urban space should be capable of providing. Among many problems, one faced by a particularly vulnerable group of population, the persons with disability (PWD), is the inaccessibility to urban public spaces and transportation. Kathmandu has become almost an unnavigable concrete jungle for the PWDs.

Cities are human creations; places in which people enable themselves to lead peaceful, healthy, prosperous, and free lives with full respect for human rights for all (MOUD, 2016). What make up a city are not just buildings, streets, alleys and fixed service areas, but social environment which give shape to social life and to relations between individuals (Baris & Uslu, 2009). They are places in which people aim to achieve gender equality, empower women and girls, reduce poverty, create jobs, and generate equitable prosperity.

In cities, public spaces serve as venues for social interaction, sociability, conviviality, and the enactment of community (Johnson & Glover, Understanding urban public space in a leisure context, 2013). Urban public spaces are a vital ingredient of successful cities and help to build a sense of community, civic identity and culture (Andersson, 2016). It includes roads and footpaths, parks, public squares, sport grounds etc. At the same time, among other urban public space features, sidewalks and walkways are equally important. They are not only the passing ways but the major part of urban street network and transportation infrastructures such as bus stops. They can enhance the urban environment and social interaction. Today, many physical deficiencies in cities have reduced the useful application of urban public spaces to minimum for the citizens and in many cases almost inconceivable to use (Sedghi, Nahibi, & Eslamlou, 2015). Kirschbaum et al. (2001) enunciated that transportation policies, especially in developing world, forget pedestrians but are mostly

focused on the needs of motorists. Nepal in general and Kathmandu specifically suffers from the same problem. Most of the infrastructures in Kathmandu are developed for vehicular movement without keeping any regard for pedestrian movement. Almost all of the urban public spaces in the country's biggest city are not accessible to people with physical disability. Several adverse effects are accounted to the ill-developed urban structures and society, such as vicious and often irreversible cycles of sprawl, automobile mobility, and reduced accessibility (Iliescu & Boitor, 2013).

Accessibility is the first goal of the present day sustainability oriented urban mobility planning promoted worldwide (Iliescu & Boitor, 2013). Accessibility has become an essential condition for the active participation of entire citizen population in urban, social and economic life. It is an important characteristic of the geography of space, whether it involves a small area or a large region (e.g., elements within a metropolitan area) and is frequently included as an important goal in transportation planning, land use planning, and building design (Church, 2002). In the context of Nepal and Kathmandu, limitations in accessibility to public urban spaces and transportation systems stand out as the most rigid physical exclusions. For many people with disabilities, daily life is severely hindered by barriers in the transportation and built-environment. People with disabilities who are willing and able to work cannot do so because of inadequate accessible transportation (Baris & Uslu, 2009). Even large urban public spaces are not fully accessible for people with reduced mobility (people with disability). In city areas, pedestrian ways often have irregular surfaces and physical obstacles that reduce their accessibility for several groups of people and not only the disabled.

Disability is loss or reduction of opportunities to participate in social life on an equal level with others that prevent PWDs to play a full role which is recognized for natural human beings (Nghosiyan & Motamedi, 2015). According to World Health Organization, disability is physical, mental, social factors or a combination of those in a way that has adverse effects on individual's life and prevents his normal life. Throughout the developing world, disabled people suffer a high incidence of poverty caused and perpetuated by a lack of access to socio-economic opportunities (Venter, et al.). The human rights approach to disability, in terms of which every citizen has the right to be included in social and economic opportunities, is slowly gaining acceptance, although much less so than in the developed world (Venter, et al.). The concepts of inclusiveness, universal design and city-for-all are emerging in physical infrastructure as well as in social infrastructure planning. Few issues of

accessibility are addressed by the government on policy level but are rarely implemented in the city planning.

According to the United Nation Convention on the Rights of Persons with disabilities, around 10 percent of the world's population, or 650 million people, live with a disability and they are the world's largest minority (Mahmoudi & Fanaei, 2010).In 2011, around 2 percent (1.94%; 513,321) of the total population of Nepal reported having "some kind of disability" (Nepal Census, 2011). According to Nepal Census 2011, breakdown of the different types of disabilities goes as this: Physical disability: 36.3% of the disabled population, Blindness/Low vision: 18.5%, Deaf/Hard of hearing: 15.4%, Speech problem: 11.5%, Multiple disabilities: 7.5%, Mental disability: 6%, Intellectual disability: 2.9%, Deaf-Blind: 1.8%. Thus, physically disabled people comprise the largest group of the disabled people.

Of all the districts in Nepal, Kathmandu has the biggest population of physically disabled and blindness/low vision people at 6,030 and 3,703 respectively. So, it is of utmost importance to develop the city as an inclusive, accessible urban environment that can truly be called a 'city-for-all'. Despite severe shortcomings, it is still the most developed urban area of Nepal and people from all over the country have and continue to pour here annually in search of better education, health care and employment opportunities. PWDs naturally form a part of this population. Due to poor development of infrastructure, most of the public places in the city such as roads, sidewalks, parks, markets, airport, open spaces, religious and touristic sites, educational institutions, bus terminals, and government buildings are not accessible for all, including persons with disabilities (National Federation of the Disable-Nepal, 2015). It is high time that this issue of limited accessibility in the city be acknowledged and addressed in policy and decision making as well as in infrastructure and urban planning.

1.2 Need of research

Cities present an opportunity for everyone to commit to share resources and space in a way that ensures lasting protection of the planet and its natural resources (MOUD, 2016). Today one of the major problems in an urban area like Kathmandu is the inappropriateness of urban public spaces in order for the PWDs to use them. Urban sidewalks and connectivity bridges are full of physical obstacles for PWDs. In many of the pedestrian ways in Kathmandu, physical obstructions are often created by vendors, construction firms, vehicle users, and

even road and cable maintenance works. Pedestrian streets are often narrow and unleveled and pavements irregular. The current haphazard, uncoordinated, and fragmented approach to infrastructure development and planning such as that of transportation and ease of excess seems to exclude entirely the PWDs in Kathmandu valley. As such, there is a need for research works that aim to investigate deeply the problems faced by PWDs in Kathmandu and further propose solutions that directly address their problems with regards to the design of urban spaces, sidewalks, pavements and other pedestrian walkways.

This research work is designed to address the concerns regarding PWDs access to urban spaces in Kathmandu and also to make those concerns heard in urban planning practices at the policy making level and local level. It aims to promote urban development plans, policies, regulations and tools that are PWDs friendly, inclusive, as well as of universal utilization value.

1.3 Importance of research

It is hoped that this research becomes important for policy makers, the local government and urban development authorities who are directly involved in drawing plans, policies and design requirements of public urban spaces. This research can also be useful to planners, designers and architects who are actually executing the drawn plans and designs in practice. Planning and designing play a major role in creating a safer, accessible and inclusive urban space.

Policy makers could for instance, use this research to understand the real problems faced by PWDs regarding their accessibility to public spaces as well as public transportation in urban areas. This research can also help them identify and prioritize the removal of barriers within the lived experiences of PWDs. They can use information gathered in this research to create guidelines and urban design solutions that incorporate the needs of disabled people. It is very important to identify specific steps that need to be taken to start addressing the problems of accessibility faced by the PWDs. Equity of access is also necessary for civic, economic and social participation of all segments of the urban population. By helping create safe and accessible urban public spaces, policy makers can improve the quality of disabled people's lives as they can get equal access to education, health, employment and recreation just as other segments of the population.

1.4 Problem statement

As Oliver (n. d.) notes, disabled people have been perceived as dependents or individuals with a specific problem which marks them out as different from the rest of the normal population. An important element in PWDs lives is their ability to gain access to particular places. However, various features of contemporary cities including physical design, institutional policies and mobility systems, might have prevented disabled people from participating in the mainstream of urban social life (Hasanvand, Ebrahimpour, Bagheri, Razmkhah, & Ghamari, 2014). Due to inaccessibility and exclusion, social spaces marked by institutional and physical barriers that separate disabled people from the mainstreams of social and economic life are prevalent in many urban areas (Gleeson, 2001). In addition to the problem of inaccessibility within public urban spaces, PWDs also experience barriers to choice of their preferred living and working environments. Disabled people are often denied employment opportunities because of inaccessible workspaces (Imrie & Hall, 2001). PWDs' equal participation in social lives is adversely affected by the infrastructural and architectural obstacles in cities which limit their movements and lead to breaking the link between this group and the rest of the society.

Although accessibility for all has been enshrined in the relevant national and international laws, disabled people in many urban areas like Kathmandu still suffer from a lack of physical accessibility to public places, buildings and transportation infrastructures in their community. A lack of attention to their physical and mobility needs is still one of the biggest challenges preventing their use of public spaces and access to possible independence. As such, their exclusion from the built environment amounts to isolation and deprivation of their human rights. Providing them with physical accessibility to public spaces (such as sidewalks, bus stops, parks etc.) is one of the fundamental ways to assist their participation in community and realization of their rights.

Many PWDs are unable to take part in important social activities. They become subject to unequal treatment merely because the urban built environment are not designed to meet their requirements and policies safeguarding their right of access to public spaces are simply disregarded or not implemented. In the context of Kathmandu, throughout the years, its urban spaces have never been built with universal utility design principles. It does not offer any basic standards of accessibility. Its public spaces like open spaces, public buildings, roads, sidewalks, transportation services and recreational spaces do not meet the needs of many segments of the community and especially that of the disabled people. Even though

some parts of the city have pedestrian infrastructures that seem to be designed for the physically disabled people, they are not continuous, leaving the chance for PWDs to be stranded in the middle of nowhere. The city has seemingly created a group of 'weak users' who are left without the right of having a normal social life.

The number of people with disabilities who can move freely without help is quite low in the urban spaces of Kathmandu. This points out to the extent to which disabled people's participation in urban and social life is limited and opportunities for them to move around independently are constrained. There are many temporary and permanent obstructions like vendors and retailers using the sidewalks, bus stops and parks, motorcyclists using pedestrian ways (sidewalks), pedestrian bridges with no ramps, improper pedestrian crossings, huge level differences between the sidewalks and streets, decreasing sidewalk widths, obstacles caused by improper plantation of trees and electric poles, improper and irregular pavements and level changes without ramps in the meeting points of sidewalks and streets. One of the aims of this research is thus, also to determine the true state of accessibility for PWDs in the city of Kathmandu and to assess whether appropriate standards are followed and applied by the relevant parties in urban space design and construction.

1.5 Research question

The main purpose of this research is to explore how the concept and idea of accessibility is implemented in urban planning in the context of Kathmandu and whether and how the urban spaces in the city are designed to meet the needs of PWDs. More specifically, this research tries to understand about the factors that have led to the poor implementation of PWD friendly policies in infrastructure planning and its consequences. As such the purpose of the research is to answer the following question:

How can accessibility be implemented in planning of public spaces in Kathmandu so that they become PWDs friendly?

1.6 Research objectives

The main objectives of this research work can be outlined as follows:

- To study the present condition of public urban spaces (sidewalks, bus parks, and open spaces) and infrastructures (bus stops, pedestrian crossings, foot

over bridges/ subways, public building entrances etc.) in Kathmandu with regards to their ease of access and utilization by the PWDs

- To identify the actual needs and determine the problems encountered by PWDs in urban areas like Kathmandu when it comes to having accessibility to public spaces and infrastructures, places of services and transportation
- To review the existing practices of planning and policies related to inclusive urban planning and development

1.7 Validity of research

Data obtained from observations and interviews in interpretivist paradigm will be backed by qualitative data to find consistency in them. Various studies related to accessibility have been carried out in the international context but in the context of Nepal, only few studies have been conducted and they too mostly concern with mobility only. Such studies have been focused mainly on problems faced by PWDs in the use of transportation. However, no study could be found that was carried out to understand the issues, problems and challenges faced by PWDs while using the public spaces. The subject and issues raised by this research are experienced by every disabled people in Kathmandu in their daily lives and is therefore, important to study. The research topic aims to address a sensitive issue and also holds a potential to draw the attention of policymakers in helping develop Kathmandu into a city that is livable for people of all kinds and abilities.

1.8 Expected outputs

In the research, issues of extremely limited access to public urban spaces faced by the PWDs in Kathmandu valley will be studied. Likewise, the research seeks to give information about the factors that have led to the poor implementation of policies and guidelines, however insufficient they are, on accessibility in physical infrastructures development. It is also expected that the research will propose concrete solutions and many policy ideas that can be taken on board by the relevant authorities and urban planners and designers in order to make Kathmandu a modern urban area where urban spaces, places of public service sand transportation are accessible to all segments of the population including the PWDs.

2 LITERATURE REVIEW

2.1 Accessibility

Accessibility is about giving equal access to everyone (Meshur, 2013). The most important term for the PWDs is the possibility of circulation; namely accessibility. Without being able to access the facilities and services found in the community, PWDs will never feel fully included in their society (United Nations, 2007). Accessibility is characterized by dimensions and values such as orientation, independence, mobility, social integration, economic self-sufficiency, transition and change (Meshur, 2013). Accessibility should enable individuals of all abilities to access and use all parts of the infrastructure system and facilities at all times (Agarwal & Chakravarti, 2014). The accessibility to urban places and pedestrian networks depends, however, on the interaction between human capabilities and environmental factors, and thus may be subdivided into physical and social factors (Gharebaghi, Mostafavi, Chavoshi, Edwards, & Fougeyrollas, 2018). Social factors such as policies can be incorporated into accessibility assessment of pedestrian networks for PWDs. The concept of independent living, without barriers, with the right of access to the whole guaranteed city, is fundamental for the understanding of accessibility (Freire, Farias, Pinto, & Prata, 2018). Accessibility must be the most essential feature of the human centered design in built environment which are considered the physical factors of accessibility (Yilmaz, 2018).

Accessibility can be divided into two broad concepts- macro accessibility and micro accessibility. The factors of macro accessibility of a given territory are linked to the facilities of connection with other territories, such as proximity to other territories, road networks connecting with other territories and provision of public transport for citizens to access this territory. On the other hand, the factors of micro accessibility of a given territory are linked to the facilities to start or end a trip within the same territory, such as traffic flow input and output devices, open spaces, parking areas, intermodal integration terminals and ease of walking, pedestrian movement etc. Accessibility depends on a number of factors, including some of the following (Rains & Butland, n.d.):

i. **Quality and range of mobility options**

   For example, walking, cycling, transit and driving which determine the relative ease of using various transportation modes in order to reach goods and services.

ii. Availability of substitutes for face-to-face services

For example, phones, internet, and delivery services which determine the degree to which information; goods and services can be obtained without leaving home.

iii. Connectivity of transportation networks

For example, sidewalks, bike paths, roads and transit routes which determine the most direct links and the density of connections and thus the time, cost and effort needed to reach them.

iv. Land use patterns

For example, complete and compact versus sprawl, which determine how far apart destinations are and the amount of time, effort and cost needed to reach them.

v. Design

For example, human-scale, universal design, complete streets etc. which determine how well spaces, facilities, vehicles, tools, and programs accommodate the needs of the people who navigate and use them.

2.2 Disability

Disability is a term, covering impairments, activity limitations, and participation restrictions. It is a complex phenomenon, reflecting an interaction between features of a person's body and features of the society in which she or he lives. It is the condition of difficulty in carrying out daily activities normally and in taking part in social life due to problems in parts of the body and the physical system as well as obstacles created by communication and by physical, social and cultural environment (Baris & Uslu, 2009).

Overall, disability is no longer perceived as a purely medical phenomenon that has to be treated with rehabilitation and institutional care (Pecchini & Giuliani, 2015). This historical tendency has been substituted with social models, where disability is the outcome of the interaction between people and their environments (WHO 2011). Social models overcome the medical perspective by perceiving disability as the consequence of social, structural and environmental barriers rather than an individual's impairment (Steinfield and Maisel, 2012).

Disability results from the interaction between persons with impairments and attitudinal and environmental barriers that hinder their full and effective participation in society on an equal

basis with others. According to the 'universalist' concept of disability, everyone may be placed on a continuum from disabled to not-disabled and argues that disability is universal since everyone is disabled at some time in their lives. According to the concept, disability is thus, an insufficient basis upon which to analyze the social condition of disabled people and develop social policy responsive to the interests of diverse population (Creswell, 2009).

The Critical Disability Theory adopts a version of the social model based on the following principles (Baral, 2018):

- Disability is a social construct, not the inevitable consequence of impairment.
- Disability is best characterized as a complex interrelationship between impairment, individual response to impairment, and the social environment.
- Social disadvantage experienced by disabled people is caused by the physical, institutional and attitudinal environment which fails to meet the needs of people who do not match the social expectation of 'normalcy' (Hosking, 2008).

On the basis of the severity of disability, it is commonly classified in the following categories (Baral, 2018):

i. **Profound disability**

   Difficulty to perform daily activities even with continuous support of others.

ii. **Severe disability**

   Inability to perform daily individual or social activities without the help of others.

iii. **Moderate (mid-level) disability**

   Ability to perform daily activities and participate in social activities if physical facility is available, environmental barrier is eradicated or trainings are provided.

iv. **Mild disability**

   Ability to participate in daily activities and social activities if barrier free environment is provided (Banskota, 2015).

The Government of Nepal has further reclassified the types of disability into 7 categories in 2007 (Baral, 2018).

i. Physically disabled

ii. Visually impaired
iii. Deaf
iv. Deaf blind
v. Speech and hearing disability
vi. Mental disability
vii. Multiple disability

This research focuses mostly on the situation of people with moderate and mild disability regarding their accessibility to urban public spaces in Kathmandu. The research, furthermore, puts particular emphasis on the situations of the physically disabled and visually impaired people (according to the classification of Government of Nepal).

2.2.1 Accessibility and universal design

Accessibility is a scope, perception and understanding for the safe and autonomous use of spaces, furniture, urban equipment, buildings, transport, information and communication, including its systems and technologies, as well as other services and facilities open to the public or private use of collective use, both in urban and rural areas, by persons with disabilities or reduced mobility (Freire, Farias, Pinto, & Prata, 2018). Universal Design is defined as the design of products and environments to be usable by all people, to the greatest extent possible, without adaptation or specialized design (Christophersen, 2002). It has also been defined as a design for all approach. Ron Mace, an architect from US who himself had polio led the team of 7 architects and designer in mid-1990s and came with the term "Universal Design" based on seven principles (Fletcher, 2002). The seven principles that defined the relationship between Universal Design and accessibility were:

i. **Equitable use:**

   The design is useful and marketable to people with diverse abilities.

ii. **Flexible in use:**

   The design accommodates a wide range of individual preferences and abilities.

iii. **Simple and intuitive:**

   Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

iv. **Perceptible information:**

The design communicates necessary information effectively to the user, regardless of their sensory abilities.

v. **Tolerance for error:**

The design reduces hazards and adverse consequences of accidents.

vi. **Low physical effort:**

The design allows efficient usage with minimum effort.

vii. **Size and space for approach and use:**

Appropriate space is provided to enable comfortable and effective use for anyone regardless of physical and sensory ability (Barnes 2011; Centre for Universal Design, 2011)

2.2.2 Accessibility and usability

In simple terms, usability describes how well the design of the environment enables functioning, performance and well-being from the user's perspective: it is based on a person being able to competently accomplish a task without undue effort or inconvenience (Iwarsson & Stahl 2003:60; Steinfeld & Danford, 2000). Being based on anthropometric principles, usability can however, inform designs and guide design processes (Steinfeld, 1997).While accessible, adaptable and visitable are measured against codes or norms, usability is measured against the person's ability to use environment (Bringolf, 2009). Iwarsson and Stahl define usability as 'the measure of effectiveness, efficiency and satisfaction with which users can achieve specified goals in a particular environment' (2003 pp.60). For example, whilst a building may be determined 'accessible' as it has ramps leading up to entrance ways, it may not be 'usable' if those ramps are steep and arduous or lead to entrance ways that prove difficult to navigate (Rains & Butland, n.d.). In other words, while the urban fabric may appear accessible, it can still present significant barriers to a disabled person, and therefore may not be considered 'usable'. Usability highlights both functionality and equality of space (Rains & Butland, n.d.).

2.2.3 Accessibility and disability

Accessibility is a right as well as prerequisite for people living with different types of disabilities towards increasing their reach to any kind of facilities and services intended to

support their participation in society (NFDN , 2018). Since the idea of accessibility is to minimize the physical effort and barriers of the PWDs, enforcing it is an integral part of infrastructure development.

It is the right of every individual to participate in daily activities, social activities, and economic activities irrespective of their physical conditions and limitations. One of the key principles of United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) is that accessibility needs to be considered while implementing all other articles and relevant provisions (NFDN , 2018). There are various international as well as national policies intended to guide the planning of any urban area to be universal and inclusive. However, at the stage of implementation and monitoring of urban development, accessibility for PWDs is often completely forgotten, creating barriers for PWDS in their social participation.

2.2.4 Barriers to accessibility

a. Structural (built environment) barriers

Structural barriers are those which result due to inaccessible built environments and provision of haphazard facilities without consideration for people with different abilities (Venter C. , 2015). These types of barriers may be created for example, by inappropriate height, width and uneven pavement of sidewalks. Obstructions like encroachment by vendors, parking on sidewalks, disposal of garbage and construction materials, electric poles, interrupted pathways, lack of ramps in pedestrian bridges, high kerbs on pedestrian crossings, lack of tactile paving on crossing of the road, tactile paving ending on trees or electric poles, transportation barriers, etc. prevent access and affect opportunities for participation for PWDs. These barriers often force people to use roads instead of sidewalks or pedestrian streets and discourage PWDs to venture out unescorted as they are vulnerable to accidents and injuries.

b. Social or attitudinal or individual barriers

Strong social and cultural attitude of individuals isolates PWDs from participating in the built environment (Venter C. , 2015). Often, social or individual barriers are also created by authorities who are not fully responsible or committed to providing sufficient measures of accessibility to PWDs. This is reflected not only in the design of infrastructures and environment but also in the purpose and practices. For example, transport staff may not show willingness to provide assistance, do not inform passengers properly about stops and do not

stop for sufficient time to allow them to board the means of transport (Pande, n.d.). Negative attitudes create a disabling environment across all domains (WHO, 2011). Most officials in developing societies think that by providing ramp on entry and universal toilet on a building creates access to the building. However, they fail to understand that in order to make a building accessible, the surrounding infrastructures should also be accessible.

c. Policy based or institutional barriers

One of the major barriers to the inclusion of people with disabilities is a lack of enforcement of policies that safeguard the rights to accessibility of PWDS and a lack of political support for such policies. In the context of Nepal, it is very much the case that there are various policies intended to make built environment inclusive but very rarely they implemented in practice (Paudel, 2020).

d. Communication Barriers

PWDs often also tend to suffer from communication barriers as they may have disabilities affecting their hearing, speaking, reading, writing, and/or understanding, and because they may use different ways to communicate than people who do not have such disabilities (CDC, 2019).

2.3 Urban public spaces

Urban public spaces stand out as particularly meaningful locations of everyday life (Johnson & Glover, Understanding Urban Public Space in a Leisure Context, 2013), for they provoke citizen involvement (Warpole, 1997) and active citizenship (Hubbard, 2001; McCann, 2002; Schaller & Modan, 2005; Staeheli & Thompson, 1997). Hou notes “public space has been an important facet of cities and urban culture, they provide opportunities for gathering, socializing, recreation, festivals, as well as protests and demonstrations” (Hou, 2010, p. 2). Parks and other urban public spaces often not only function as forums for community involvement and regeneration (Mc-Inroy, 2000), but can also help create a sense of place and belonging for urban residents (Low & Altman, 1992). All urban spaces play a key role in human-environment interaction and enable people to develop their creative powers (Meshur, 2013).

For Jane Jacobs in Death and Life of Great Cities (2014), sidewalks and roads are vital organs of a city as it is in them that all the integration and coexistence of a society takes

place. Furthermore, the main protagonists of the use and occupation of streets and sidewalks is the people.

2.3.1 Urban public open spaces

In defining public open space, it is essential to break up the words that make up the concept. Oxford dictionary provides the following definitions for some of the key words that describe the concept of 'urban public open spaces':

Public: open to or shared by the people;

Open: not closed or blocked up, allowing entrance or passage or access to public; and

Space: interval between points or objects, area.

The urban open spaces especially known as public open spaces such as parks and open breathing areas can be considered as the lungs of an urban center where people can breathe, relax and feel good about their lives and health. Lively urban areas are created by popular open spaces or civic spaces. Popular open spaces are those that cater for all the needs of the communities and the urbanites. They include all types of spaces between buildings in towns, such as paths, squares, gardens, parks, etc. Open spaces and parks in urban areas serve three major purposes – first, they provide breathing spaces and open air; second, they improve the physical, social and psychological health of the city as they enhance not only the city's aesthetics and beauty but also provide spaces for social interaction and recreation and contribute to the livability of a city; and third, they also serve critical purposes of evacuation during disasters, particularly during earthquakes (NUDS, 2017).

In the following parts of this section, some of the most important parts of urban open public spaces are discussed.

a. Sidewalks (pedestrian ways)

Figure 1 shows the pyramid of needs of pedestrians in public spaces. At the base of the pyramid are the so-called Preconditions which deal with the issues of existence with aspects related to safety, security, ease of movement etc. (Amoroso, Castelluccio, & Maritano, 2012). When there is a feeling of being lost or uncertainty about how to proceed, pedestrians can be engulfed with uncertainty, fear concerns of safety and certainly discomfort (Winters et al.). The ease of way finding, the usability of a particular form of transport or transit

system or pedestrian facilities and public buildings is therefore fundamentally important for pedestrians.

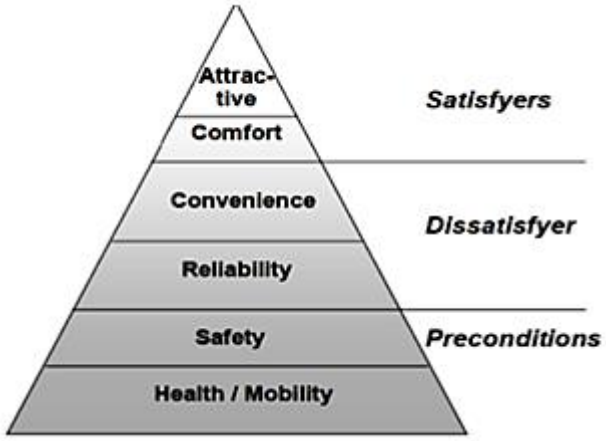


Figure 1. *Pyramid of needs of pedestrians in public spaces*

The middle tiers of the pyramid are related to convenience and reliability. Pedestrian ways should be free of obstructions so that people with different abilities can move without difficulty. They should also be trustworthy and stable so that people can move without any fear and discomfort in the built environment. Some of the aspects of the pedestrian ways defined by this tier of the pyramid are related to persuasion such as consistency, reciprocity, authority, liking, etc. (Amoroso, Castelluccio, & Maritano, 2012).

At the apex of the pyramid are characteristics of the pedestrian ways such as comfort and attractiveness. The pedestrian ways should be attractive and inviting for its use as well as comfortable enough to promote the mobility of PWDs.

Attributes of a good pedestrian facility

Some common attributes of a good pedestrian facility including sidewalks can be summarized as below:

i. **Accessibility**

   Pedestrian facilities should be accessible to all pedestrians, irrespective of their abilities.

ii. **Connectivity:**

   Pedestrian facilities should be well networked for pedestrians to choose the most convenient path.

iii. **Safety:**

Pedestrian facilities should provide a sense of safety to the pedestrians and should not be threatened or overwhelmed by vehicles and other structures.

iv. **Comfort:**

Pedestrian facilities should be comfortable to use for people of all ages and abilities.

v. **Ambience:**

Pedestrian facilities should have good ambience to make them seem inviting for pedestrians to use.

vi. **Place making:**

Pedestrian facilities should provide space for people to gather and socialize.

Guidelines for making pedestrian ways accessible for PWDs

Sidewalks or pedestrian ways at the minimum should be sufficiently wide enough, continuous, have a level surface, and be slip-free. Gradients should be limited to allow users of manual wheelchairs to negotiate them easily, and where this is not possible, level resting areas should be provided at 10-meter intervals. The footways or pedestrian areas should also have clear pathways and be free of obstructions, protruding objects, street furniture, and overhanging trees and bushes so that they are appropriate, safe and easy for mobility for users with different abilities.

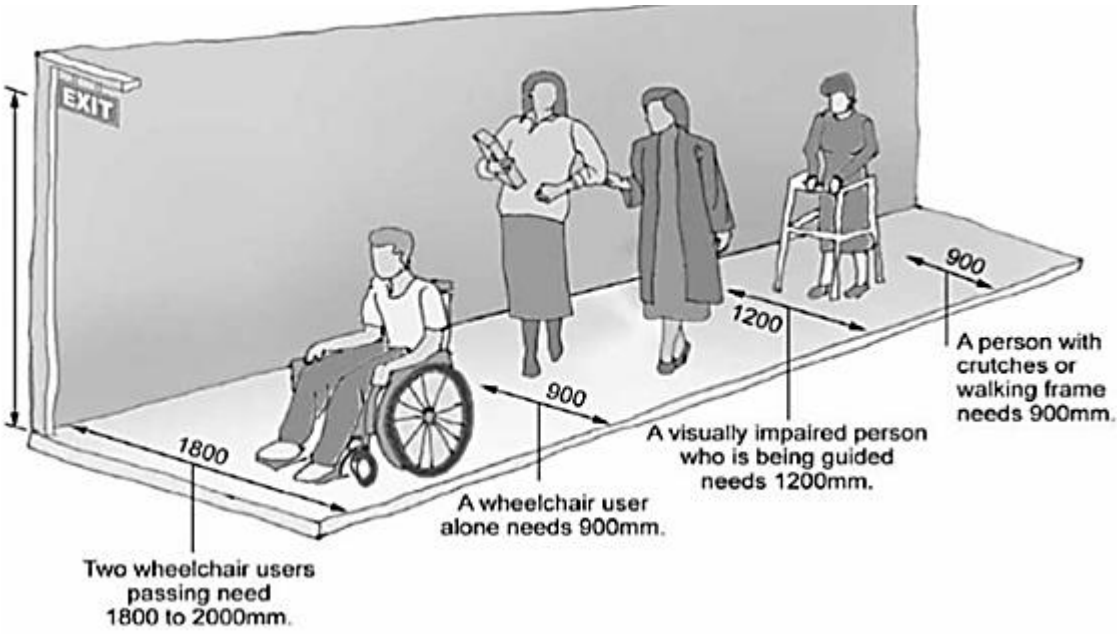


Figure 2. *Minimum dimensions for walkways (Oxley, 2002)*

Furthermore, pedestrian ways or sidewalks should also be firm, durable, regularly maintained, adequately ramped with appropriately designed kerbs and equipped with tactile surfaces and handrails to prevent falling (as required). To enable two wheelchair users to pass on a pathway, a minimum unobstructed width of 1800 mm is recommended (Miles, Ballantyne, & Gravelle, 2013). Gradients of pathways should not be steeper than 1:20 (approximately a 3 degree inclination) or a maximum of 1:12 (approximately a 5 degree inclination) for short distance, and not involve undue changes in level. Long slopes should be divided into stages by incorporating resting areas at approximately 50 m intervals. If possible, different materials, colors etc. may be used to assist recognition and orientation for persons with vision impairment, e.g. contrasting lines painted on either edge of a pathway. Figure 3 below demonstrates some of the key aspects of these guidelines regarding the PWDs friendly sidewalks.

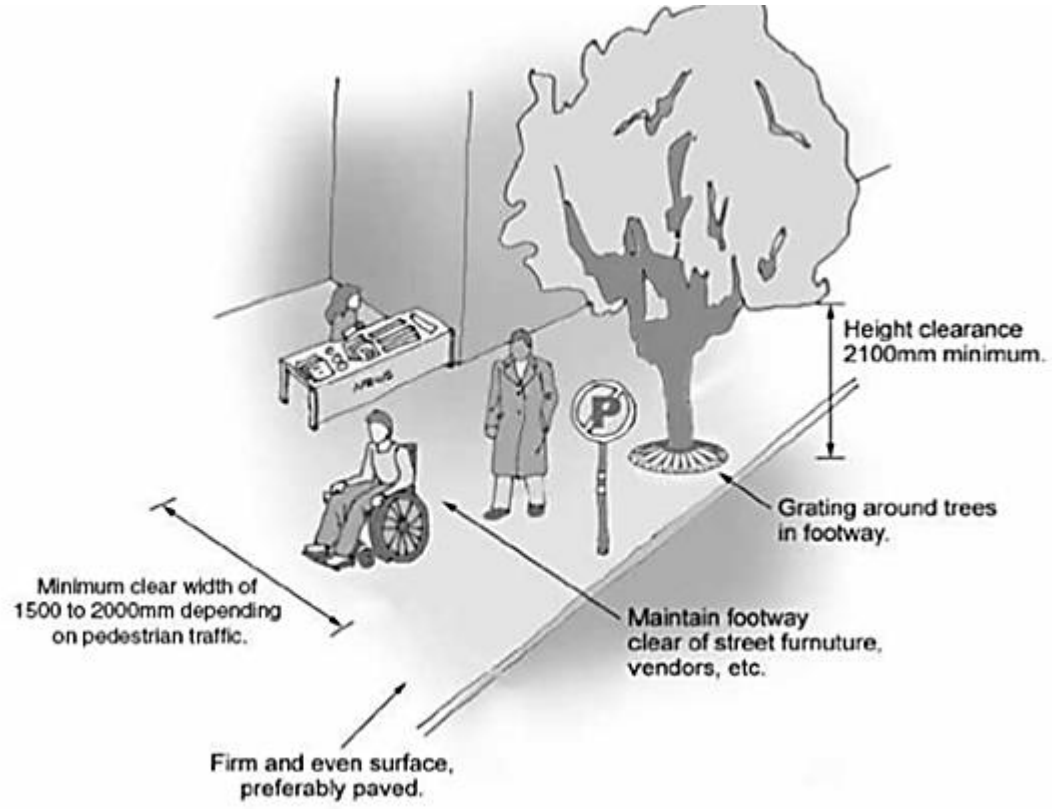


Figure 3. *Requirements for footways, sidewalks or pavements*

Kerbs (a stone or concrete edging to a pavement or raised path)

Kerbstones can be usually used to prevent vehicles from driving up onto the pathways (UNICEF, 2015). However, kerb ramps that meet relevant standards should be installed at points where pathways are specifically designed for crossing frequently used roads. As highlighted also in Figure 4, the key recommended specifications are (Miles, Ballantyne, & Gravelle, 2013):

- Minimum ramp width of 1200 mm in new constructions. In restricted spaces, the minimum width should not be less than 915 mm.
- Kerb ramp alignment should be perpendicular to the kerb face.
- Detectable warnings with a visual contrast with the adjacent walking surfaces across the lower part of the ramp are required.
- Sidewalk approach width should be of a minimum of 1200 mm.

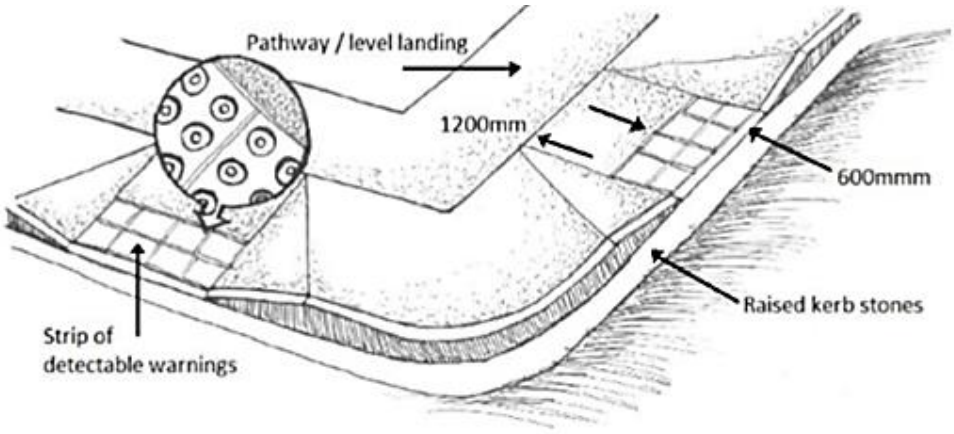


Figure 4. *Kerb ramps for pathway (US Department of Transportation)*

When kerbs are under construction, there should be secure arrangement with warning signs and protective barriers to construction sites in order to enable persons with vision impairments to register the presence of such obstacles and minimize the risk of injuring themselves.

b. Parking

Private cars and modified scooters are a practical method of transport for some PWDs and accessible parking must therefore be an important consideration. In developing countries like Nepal, PWDs who can afford private cars are relatively few in number. Yet, as car and other motorized vehicle ownership increases in general, it is a good practice to provide accessible parking in key public facilities and buildings (UNICEF, 2015). Well positioned car or motor-bike parking should be reserved with signage, adequate space and level connection to pathways.

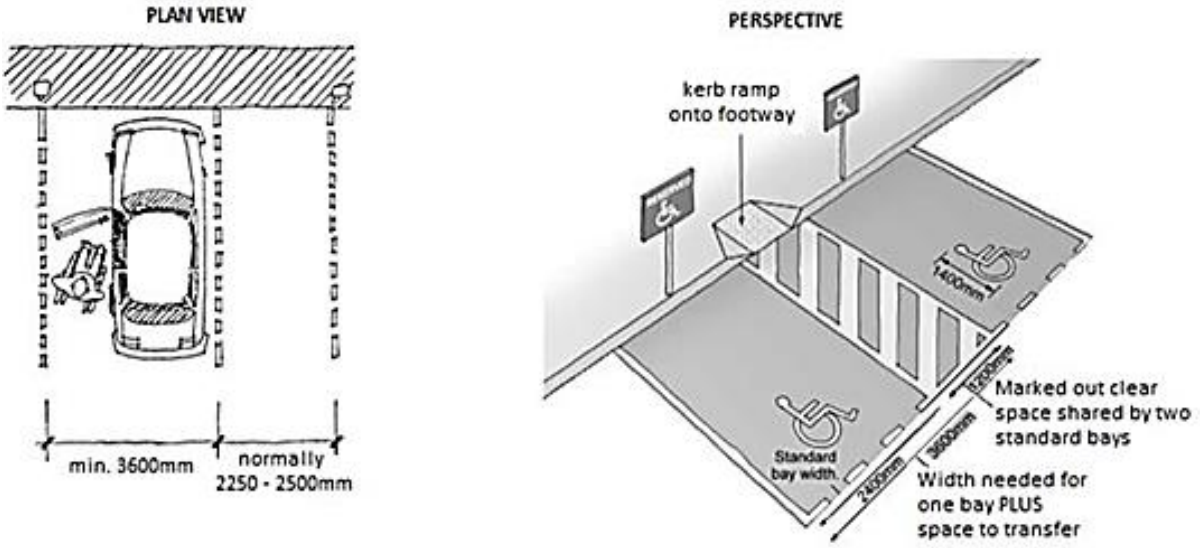


Figure 5. *Requirements of accessible parking*

Where parking is provided, a minimum of one accessible designated parking space should be provided in every parking area for PWDs as close as possible (less than 50 m). Parking space should be wide enough for car doors to be fully opened to allow drivers and passengers with disabilities to transfer to a wheelchair or other assistive devices parked alongside (as depicted in Figure 5). The recommended minimum width of the parking space for a car is 3.6 m and the minimum length is 5.4 m. This minimum width includes the transfer area beside the car with a minimum of 1.2 m.

Signage for parking

The location of accessible parking spaces should be clearly signposted from the car park entrance and it should be identified as a provision for drivers or passengers with disabilities only (Miles, Ballantyne, & Gravelle, 2013). Designated accessible parking spaces should be marked both on the pavement and using a vertical sign with the international symbol for accessible parking space to indicate the location of the designated accessible parking.

Surface of parking

The accessible parking space should be on firm and leveled ground with no variation of surface exceeding 5 mm, between paving, surface features and mix of different surfaces or finishes. The designated accessible parking spaces should be located on a gradient not greater, throughout its length and its width, than 1:50 (Miles, Ballantyne, & Gravelle, 2013).

Kerb ramp from parking space to an adjacent higher pedestrian path

The kerb ramp should be located in close proximity to the designated accessible parking area connecting the accessible pedestrian way as depicted in Figure 6.

Figure 6. *Plan of street accessible parking with kerb ramp (Centre for accessible environments and RIBA 2004)*

c. Bus Stops

Bus stops are one of the most important infrastructures for the mobility and accessibility of people with different abilities. They should be free from obstruction and easily accessible from nearest public spaces. Bus shelters can be carved out at niches in the street furnishing zone of the footpath/ sidewalk, such that pedestrians can walk clearly behind the bus shelter without getting into conflict with the people waiting at the bus stop (Urban Mobility India Conference & Expo 2015). A depiction of these requirements of the bus stops is presented on Figure 7.

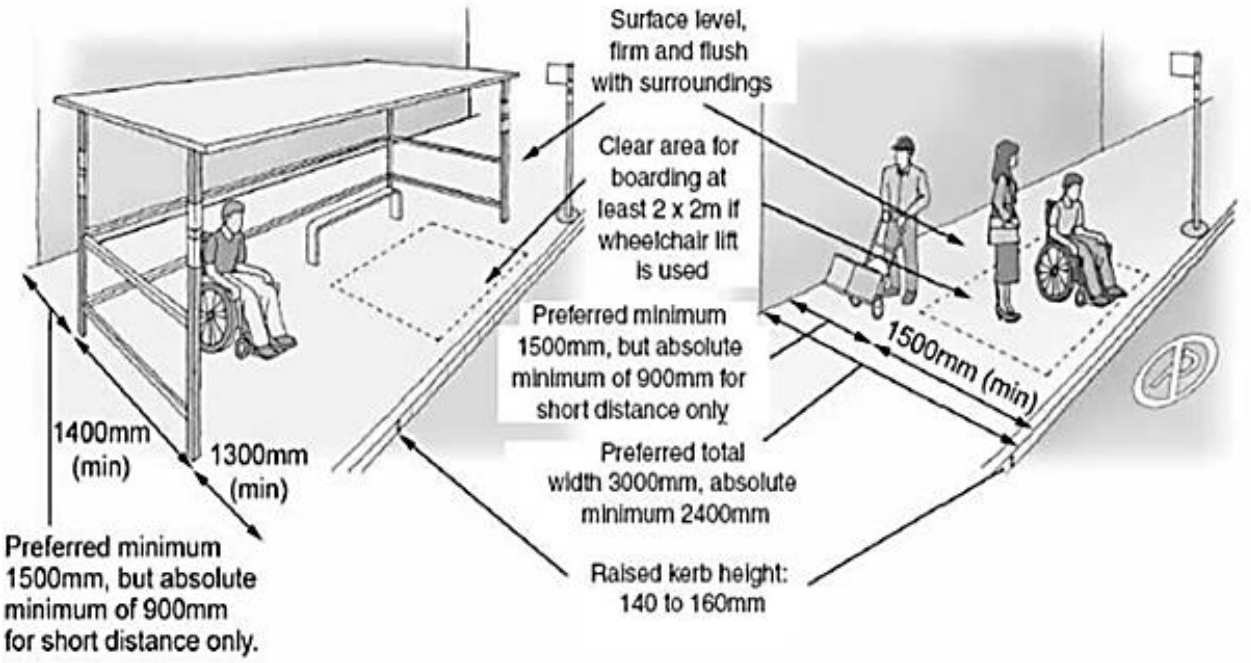


Figure 7. *Requirements for accessible bus stop (Urban Mobility India Conference & Expo 2015)*

d. Pedestrian crossings

Pedestrian safety represents a crucial issue for transport road policy (Pecchini & Giuliani, 2015). Pedestrians are particularly exposed to risks related to road environment. In fact, despite their limited representation in traffic events, pedestrian injuries and fatalities are overrepresented in traffic crash statistics (Shinar, 2008). The lowest levels of safety are reached when crossing the streets (Elvik et al. 2009), which is recognized as a complex task that involves gathering, processing, and acting on information that is time dependent (WHO, 2013).

Interaction between drivers and pedestrians is the most critical aspect of this complex set of sequential behaviors (Pecchini & Giuliani, 2015). Despite wide variations between countries, drivers are not generally used to slowing down when approaching zebra crossings, as well as giving the right of way to pedestrians who stand at the kerbs waiting for crossing the street (Hamed 2001; Sisiopiku and Akin 2003; Fi 229 and Igazvölgyi 2013; Balk et al. 2014). The pedestrians have to detect traffic and estimate whether the time that will elapse before the coming of the next vehicle is long enough for crossing the street safely (Lobjois and Cavallo 2007). In other words, pedestrians have to determine time gaps between vehicles and relate

them to the so-called critical gap that is “the time in seconds below which a pedestrian will not attempt to begin crossing the street” (Highway Capacity Manual 2010).

The question then arises whether crossing the street is even more dangerous and troublesome for PWDs (Pecchini & Giuliani, 2015). As a matter of fact, when deciding to cross the street, they have to process more information and exert more caution than not-impaired people do in order to compensate their limitations (Pecchini & Giuliani, 2015). Consequently, PWDs are even more exposed to dangers when crossing the street and generally wait for greater traffic gaps than those accepted by not-impaired individuals (Pecchini & Giuliani, 2015). These considerations suggest higher delays for disabled pedestrians standing at the kerb-side and accentuated anxiety when crossing the street.

Figure 8 describes the requirements needed for pedestrian crossings. Pedestrian crossings should have clearly marked zebra crossings with contrasting colors. The paved surface of sidewalks and crossing should be non-slippery. If there are exposed gutters or obstructions such as potholes and broken pavements, they should be covered to provide unobstructed sidewalks and pedestrian crossings and repaired as soon as possible. The cross width gradient of sidewalks should not be more than 2%. Tactile paving from the sidewalks should continue to crossings with warning tiles on either side of the crossings. The ramp gradient on crossing should be less than 8%. The level difference between road and sidewalk in crossings should not be greater than 20 mm. Traffic lights at the crossings should have audible signals installed with them so as to enable easy access for the visually impaired people.

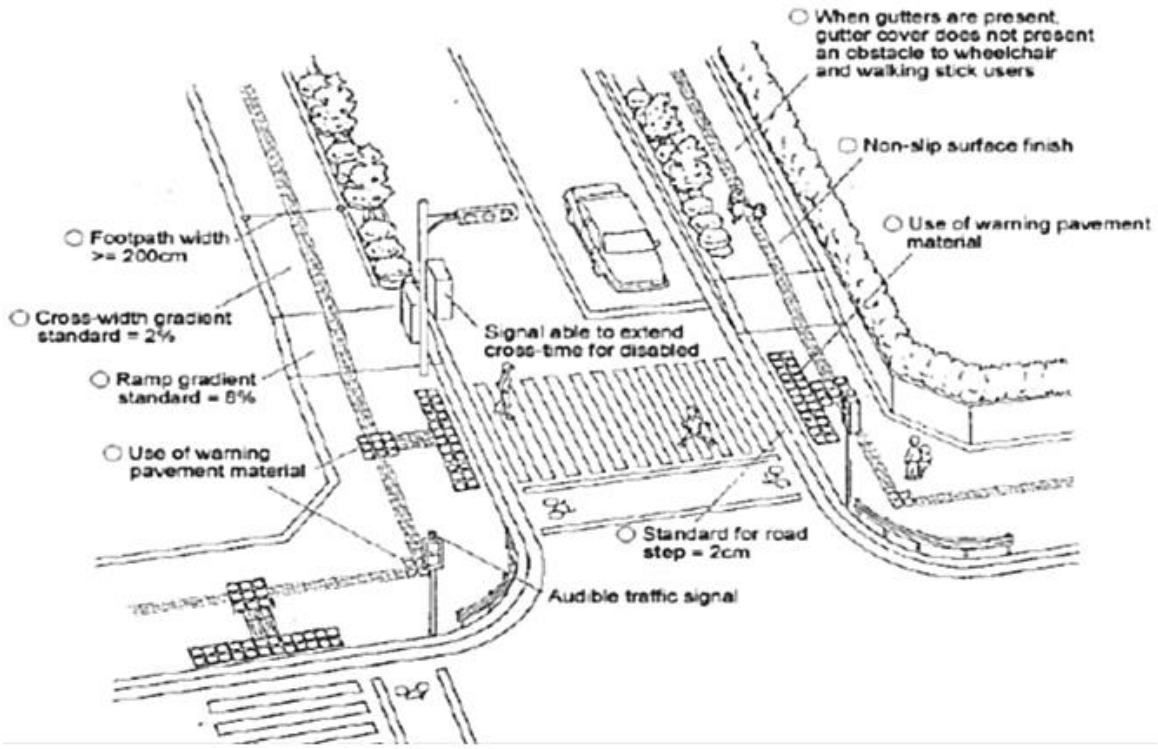


Figure 8. *Requirements of accessible pedestrian crossing*

e. Subways/ foot over bridges

Foot over bridges and subways allow a continuous flow of pedestrians through junctions without the need to wait at the kerb-sides to cross and also reduce traffic congestion. All foot over bridges and sub ways should be universally accessible i.e. with provision of staircases, ramps and elevators so that no one is left without safe means of route navigation. The ramps should have slope of 5% with appropriate landing (Miles, Ballantyne, & Gravelle, 2013).

2.4 Recognition of the rights of the Disabled in international context

In 1975 the UN produced its Declaration of Rights for Disabled People followed in 1982 by the adoption of World Program of Action Concerning Disabled People by its General Assembly (Baral, 2018). Then, a United Nations world conference on Education for All was held in Jomtien, Thailand in 1990 calling for educational opportunities to meet the basic learning needs of all, followed by a world conference on Special Needs Education: Access and Quality in Salamanca, Spain in 1994 which produced the Salamanca Statement and Framework for Action (Banskota, 2015). At the end of 1992, the United Nations Standard Rules on the equalization of Opportunities for Persons with Disabilities was produced which

provided a basis for international co-operation and an instrument for policy-making and actions for PWDs (WHO, 2011). However, these rules have no formal, mandatory, binding authority (Baral, 2018). In 1997, the Dhaka Declaration has stated that handicap and disability are development issues and should be addressed in every sector of development. The decade from 2003 to 2012 has been stated as being the Asian and Pacific Decade of Disabled Persons (Baral, 2018). In response to that UNESCAP has produced the Biwako Millennium Framework for Acton: towards an inclusive, barrier-free and rights based society for persons with disabilities in Asia and Pacific (Baral, 2018).

2.4.1 Sustainable Development Goals

During the 2012 United Nations Conference on Sustainable Development (Rio +20 Member States) agreed to launch a process to develop a set of Sustainable Development Goals (SDGs) to succeed the Millennium Development Goals (MDGs). The major objectives of SDGs are to address all three dimensions of sustainable development (environmental, economic and social) and be coherent with and integrated into the United Nations global development agenda beyond 2015 (UNDESA, 2020). The envisaged SDGs have a time horizon of 2015 to 2030.

Disability is referenced in various parts of the SDGs and specifically in parts related to education, growth and employment, inequality, accessibility of human settlements as well as data collection and monitoring of the SDGs, for instance:

i. **Goal 4**

   Inclusive and equitable quality education and promotion of lifelong learning opportunities for all focuses on eliminating gender disparities in education and ensuring equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities. In addition, the proposal calls for building and upgrading education facilities that are child, disability and gender sensitive and also provide safe, non-violent, inclusive and effective learning environments for all (UNDESA, 2020).

ii. **Goal 8:**

   To promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all. The international community aims to achieve full and productive employment and decent work for all women

and men including for persons with disabilities and equal pay for work of equal value (UNDESA, 2020).

iii. **Goal 10:**

Strives to reduce inequality within and among countries by empowering and promoting the social, economic and political inclusion for all, including persons with disabilities (UNDESA, 2020).

iv. **Goal 11:**

To make cities and human settlements inclusive, safe and sustainable. To realize this goal, member states are called upon to provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations such as persons with disabilities. It ensures the universal access to safe, inclusive and accessible, green and public spaces, particularly for persons with disabilities.

v. **Goal 17:**

Stresses that in order to strengthen the means of implementation and revitalize global partnership for sustainable development, collection of data, monitoring and accountability of the SDGs are crucial. Member States are called upon to enhance capacity-building support to developing countries, including least developed countries (LDCs) and small island developing states (SIDS), which would significantly increase the availability of high-quality, timely and reliable data that is also disaggregated by disability.

2.4.2 New Urban Agenda

The vision of NUA (New Urban Agenda) is cities for all, as a common good essential to quality of life. By putting people in the center and offering quality of life beyond the provision of infrastructure and service development (MOUD, 2016). They should be inclusive and free from any form of discrimination where all people can enjoy equal rights and opportunities. Urban development should be participatory and engendering a feeling of belonging and ownership among all, practicing civic engagement and enhancing participation of all in the formulation, implementation, monitoring and budgeting of urban policies and plans strengthening effectiveness, transparency and accountability. It ensures

the equitable access for all, to public goods and services, livelihoods and decent work and constructing quality and accessible public space for enhancing social interactions and political participation. It focuses on promoting sustainable urban mobility that links people, places and opportunities (MOUD, 2016).

The goal of NUA is to make cities and human settlements inclusive, safe, resilient, sustainable and smart in order to enhance their ability to provide decent jobs and adequate infrastructure and services to the ever-growing urban population. The objectives of NUA are first; sustainable and inclusive urban prosperity and opportunities for all, second; sustainable urban development for social inclusion and poverty eradication leaving no one behind (MOUD, 2016).

2.5 Recognition of the rights of the Disabled in national context

From Nepalese perspective, substantial change in Nepali society's perception of PWDs took place in 1977 after the formation of the Social Service National Coordination Council that was headed by the then Queen Aishwarya Shah. It was followed by several important changes such as the establishment of the Ministry for Social Welfare, the enactment of legislation for the Rights and Welfare of the Disabled, establishment of Social Welfare Council etc. (Joshi, 2004). In 1994, the Disabled Protection and Welfare Regulation (the "DPW Regulation") was framed to implement the DPW Act. Nepal signed the Convention on the Rights of Persons with Disabilities (the "CRPD") and the Optional Protocol to the Convention on the Rights of Persons with Disabilities (the "Optional Protocol") on 2008, and also ratified them on 2009 (Banskota, 2015). The Constitution of Nepal, 2015 (the "Constitution") guarantees human rights and fundamental freedom to all its citizens. Most of the important changes however, initiated only after 2006 following the decade-long civil conflict that has forced Nepal to provide high political priority to social inclusion and human rights, including those of the PWDs (Banskota, 2015).

2.5.1 The legislative framework and guidelines

In Nepal, the Act Relating to Rights of Persons with Disabilities, 2074 (2017), article 3 talks about the rights of disabled peoples and their right of access to services, facilities and justice. There are various guidelines and directives provided by the Nepal government, but these provisions have not brought any positive changes at implementation level. Lack of monitoring and strong will for enforcement of compliance is widely cited as the key

impediment to providing inclusive and accessible physical infrastructures in Nepal. The legislation is not matched adequately by detailed regulatory frameworks and a very limited response on the ground is generated. Lack of data makes it impossible to provide a meaningful overall cost estimate for the interventions required to meet the accessibility needs of disabled people in developing countries (Venter, 2002). Large scale research should be conducted to identify how people behave and function in ergonomic terms. Nepal has also ratified the U.N. Convention on the Right of Persons with Disabilities, a protocol which makes accessibility a mandatory agenda for the countries that ratify it. The General Principles of the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) talks about full and effective participation and inclusion of people of all kinds of abilities in society (Article 3(c)) and accessibility (Article 3(f)). The Preamble under its sections e, g and k emphasize on the importance of mainstreaming disability by recognizing and preventing attitudinal and environmental barriers. Furthermore, Article 30 specifically deals with the participation in and access to cultural life, recreation, leisure and sport.

The provisions on access for people with disabilities in the PWD Act, 2074 of Nepal are framed as contingent entitlements, but the nature of the legal obligations is somewhat vague. There are indeed no specific enforcement provisions or sanctions for failure of authorities to be proactive in undertaking their obligations under the Act. Nor is a mechanism spelt out for how authorities should move to implement the Act's provisions, e.g., amendment of by-laws, monitory works, etc. While the PWD Act can be considered a starting point in promoting accessibility, there is clearly a significant need to build on it.

The current enforcement of infrastructure development indicates that accessibility for PWDs is an unrealized goal in Nepal so far. Institutional coordination and poor implementation are major issues in promoting access. The institutional issues in promoting access reflect deeper challenges of accountability. There have been several policies that direct making barrier-free environment, but they fail to explain how such policies would be put into implementation. In this respect, the PWD Act itself is not of great use in terms of establishing clear lines of accountability for ensuring that accessibility standards are adhered to. A further important weakness in improving accountability has been the general lack of consultation with PWDs themselves in prioritizing investments to promote accessibility, and in monitoring accessibility outcomes (World Bank, 2007).

2.6 Policy review

2.6.1 National Urban Development Strategy 2017

National Urban Development Strategy (NUDS) 2017 is a strategic document that addresses the present condition of urban development and defines the scope of urbanization and urban development. Main goal of this document is to establish benchmarks and standards for urban infrastructure, environment, urban planning and management. It also advocates inclusive development of urban infrastructures. It assures that equitable access to open spaces for all must be the prime guiding principle in urban planning. The form of the urban landscape must evolve from this very concern in the first place. However, in Nepal the issue of open spaces in urban areas has largely remained ignored in both policy discourses as well as in the practice of urban development (NUDS, 2017).

2.6.2 Nepal Road Standard 2070

According to the Nepal Road Standard 2070, provision of footpaths should be made on all roads passing through populated areas. Width of the footpath depends on the volume of anticipated pedestrian traffic. But a minimum width of 1.5 m is required. In case of narrow footpaths (<1.8m wide) a passing zone of a minimum width of 1.8m and length of 2.0m is to be provided at every 50m or less for passing of two wheelchairs.

According to the Standard, the minimum width of footpaths for various volumes of pedestrian traffic should be as shown in Table 1 below:

Table 1. Minimum width of footpaths required versus hourly volume of pedestrian traffic flow

Hourly Design Flow (both ways) of 15 min peak period (number of persons)	Footpath width, (m)
Up-to 500	1.5
500-1500	2.0
1500-2500	2.5
2500-3500	3.0

2.6.3 Accessible Physical Structure and Communication Service Directive for People with Disabilities, 2013

The "Accessible Physical Structure and Communication Service Directive for People with Disabilities, 2013" intends to give directives guiding the construction, design and provision of various elements of urban public spaces, some of which are discussed below.

Public roads and sidewalks

Government of Nepal, local bodies, other concerned agencies or institutions should make the following arrangements while constructing or ordering the construction of public roads and sidewalks to be readily accessible for people with disabilities:

- All public roads should be made accessible for equal and convenient mobility of people with disabilities.
- For requisite of Section above, all newly built roads should be constructed to be completely accessible for mobility of people with disabilities including people who use wheelchair, people who use crutches, people who use artificial limbs, people who have visual impairments or people who have physical limitations and existing barriers in existing roads for movement of people with disabilities should be removed.
- Tactile blocks should be laid in sidewalks and road crossings on newly constructed main big roads for free movement of people who are blind and in case of existing roads, tactile blocks should be laid during maintenance work.
- Sidewalks should be made accessible in such a way that people with disabilities including people who use wheelchair can easily and freely move with their assistive devices.

- Ramps should be provided at different places including road crossings and places where PWDs switch from one sidewalk to another.
- While placing new traffic lights at major roads, to help people with visual impairment in crossing the roads, the lights should be compulsorily accompanied with sirens or similar auditory information devices to inform about the change of lights and whether it is safe to cross the road. Such kind of arrangement should also be made in existing roads.
- As it is impossible for a wheelchair user and inconvenient for people who use assistive devices like crutches and caliper to cross roads via overhead bridges, appropriate alternative arrangements shall be made for them.

Recreational parks

According to the Directive, Government of Nepal, local bodies, other concerned agencies or institutions should, while constructing or ordering private sector to construct recreational parks, ensure that they support easy mobility and provide access to the parks and to the physical structures inside the parks for people with disability including people who use wheelchair, people who use crutches, people who have visual impairment, and people who have other physical limitations. Similar kinds of old structures should also be gradually made accessible for PWDs.

Playgrounds

According to the Directive, Government of Nepal, local bodies, other concerned agencies or institutions should make the following arrangements while constructing or ordering the construction of playgrounds to be accessible for PWDs:

- Playground shall be developed, constructed and improved in such a manner that people with disabilities can also play and watch the game there.
- For requisite of the Section mentioned above, an arrangement should be made for PWDs by constructing ramp to get into the needful places of playground and other essential facilities available in the premises of playground like public toilet, canteen, covered hall etc. with wheelchair or other assistive devices.
- Specific portion of audience hall shall be assigned for people with disabilities and made it accessible with various facilities including ramp to reach the place by people who use wheelchair, people who use crutches or people with

mobility impairment. Out of total seating capacity of the playground, 5% seats shall be allocated for PWDs. If the audience hall is divided into different categories, a portion of each category's seats should be made accessible to be usable by PWDs.

Public toilets

The Directive also mandates that while constructing new public toilets and/ or travel paths to the toilets, their doors, inner spaces and purity spaces etc., Government of Nepal, local bodies, other concerned agencies or institutions should make them accessible for all PWDs including people who use wheelchair, crutches, and people who have visual impairments or other physical limitations.

Public buildings

According to the Directive, Government of Nepal, local bodies and other concerned agencies or institutions should, while constructing or ordering to construct public buildings to be opened for general people, make the following arrangements in order to make them accessible for PWDs:

- So that PWDS can themselves freely enter market or public buildings and purchase required materials or get other services and opportunities, the ground floor of the buildings should be level with both sides of the adjoining road; or sidewalk should be built parallel or with minimum height and kerb ramps that are usable by PWDs with wheelchairs.
- Link road from the main road or sidewalk to the premises of any public building or structure built by private, semi-governmental or non-governmental bodies for the requisite of public use or utility shall be constructed in such a manner that there are not any barriers to people with all kinds of disabilities, including people who use wheelchair or crutches, people who have visual impairments or other physical limitations.
- Public buildings which are built for providing direct services to public, such as ministries or departments, banks, hospitals, offices of information and communication, government offices, shopping centers, political parties' offices etc., should have arrangements to provide facilities from ground floor as much as possible and if these services are available on floors other than the ground floor, lifts and ramps or both should be mandatorily arranged.

- Main entrance to toilets, service counters, inquiry and reception areas inside public buildings or their premises should be made accessible for people with all kinds of disabilities, including people who use wheelchair and crutches and people who have visual impairments and other physical limitations.
- In order for PWDs to get and know about various services available inside public buildings, essential notice and information regarding the availability of such should also be available in Braille script and be at places easily accessible to all.
- As far as possible, at least one accessible elevator should be kept compulsorily in two or more than two storied public buildings.

Bus parks

The Directive mandates that when public bus parks are constructed or ordered to be constructed by Government of Nepal, local bodies, other concerned agencies or institutions, ticket counters, vehicle waiting spaces, toilets inside premises, platforms for passengers to get into buses etc. should be made accessible for people with all kinds of disabilities including people who use wheelchair and crutches, people who have visual impairments and other physical limitations.

Passenger loading zones

During the construction of passenger loading zones by the bodies or agencies of the Government of Nepal or by firms ordered by them, the Directive mandates that the following arrangements must be made to make such passenger loading zones accessible for PWDs:

- Passenger loading zones for public vehicles in streets should be made accessible and user friendly for people with all kinds of disabilities.
- For requisite of Section mentioned above, special attention should be paid to the height of the zone from streets, arrangement of ramp, required space for wheelchairs, seating place for waiting vehicles etc.

Public transportation

The Directive outlines the following codes for making means of public transportation accessible for PWDs:

- When transportation entrepreneurs purchase new public buses, they should be accessible and usable for people with all kinds of disabilities.

- Revenue discount as stipulated in Economic Act shall be provided on importing or purchasing disability friendly public transportation in accordance with Sub-Section (1) mentioned above.

In order to make existing old public buses accessible, Government of Nepal will encourage entrepreneurs by making various arrangements including tax exemption as stipulated in the Finance Act.

2.6.4 National Building Code- 2064

The National Building Code of 2064 directs that at least one primary entrance to a building shall be usable by the physically disabled and be on the level that would provide access to elevators where provided. There should be access ramps for wheelchairs and they shall not have gradients in excess of 1:12. Level platforms shall be provided at a maximum of 1800 mm height. Level platforms shall also be provided at tops and changes of direction. The minimum widths of wheelchair accessible ramps shall be 900 mm for apartments and residential uses, and 1000 mm for all other building types. Handrails are required when the total rise exceeds 600 mm.

2.6.5 Review of Report on Accessibility Audit of Kathmandu, Nepal

National Federation of Disabled-Nepal (NFDN) and Christian Blind Mission (CBM), with the technical support of Square Unit Pvt. Ltd. and in collaboration with KMC, have made a report called Accessibility Audit of Kathmandu. The report has developed an accessibility checklist to evaluate the present condition of public spaces of Kathmandu Metropolitan City (KMC), including external and internal facilities of public spaces. The report has evaluated for example, whether the access routes to reach infrastructures, parking, sidewalks, foot over-bridges, access ramps, main entrances to public buildings, hospital buildings, educational and commercial buildings, recreation, entertainment, sanitary and transportation facilities, evacuation routes, information and communication are accessible to PWDs or not. Even though the report has detailed out the checklist of general requirements of accessibility in such places, it has failed to deliver a comprehensive approach to improving the present condition of accessibility or rather the lack of, in such places. It seems to focus on internal accessibility of commercial, hospital and educational buildings but fails to address the external linkages of services and public spaces. Needless to say, even though accessibility inside the places of public services is equally important, PWDs cannot make use of them if they cannot reach those places in the first place because of a lack of accessibility. So, a more

holistic and comprehensive study than this report is necessary to understand the accessibility needs of PWDs at root level.

2.7 Examples of accessible urban spaces development in international context

2.7.1 Example 1: Breda, The Netherlands

Breda is an old European town with a population 185,000 people. It was an important center during the Holy Roman Empire. Medieval city centers and cobble-stoned markets are a recipe for broken castor wheels and painful pressure sores for wheelchair users.

In this town, the cost of living for disabled people is, on average, $583 a month higher than for their non-disabled peers, a substantial amount of which goes towards paying for taxi journeys to mitigate inaccessible public transport options (EU, 2018). The cost of damaged equipment and medical bills from injuries and the feeling of fear and isolation created by lack of access were a recipe for the city to become difficult and anxiety-inducing.

The city authorities in Breda then started about making the city equally accessible for people with all kinds of abilities. To start with, they have pulled up all the cobblestones in the center that surround the Grote Market and Grote Kerk market place and church. The cobblestones are turned upside-down and sliced width-ways resulting in smooth and flat surfaces at public spaces of the center which made them more comfortably navigable for those with mobility impairments while keeping Breda's streets just as aesthetically pleasing as they were before.

Figure 9. *Flipped and sliced cobblestones to improve accessibility (maekfoto/ Alamy)*

Living without barriers

In Breda, all buses and bus stops are accessible to people with all kinds of abilities with digital information and smart phone navigation apps as well as step free accesses. The newly constructed railway station is fully accessible to people with all kinds of abilities. The city is running the project 'Living without Barriers' which focuses on accessible environments and transportations as well as in housing and local communities. PWDs are involved at every stage of the city's projects and initiatives. It brings the PWDs together to make the city accessible in which they can move freely without any barriers. It has well and truly adhered to the principles of the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD).

Figure 10. *Pedestrian crossing of Breda (Google street map, 2019)*

The city has provided with wide and flat pathways to increase mobility and accessibility for people with reduced mobility. There is provision of portable threshold ramps in every shops of the Breda to encourage business from customers of all abilities. There are streets with tactile navigation lines to help visually impaired visitors move from the train station to the city centre. According to accessibility expert Emily Yates, wheelchair users and other PWDs have continuously consulted with the policy makers and planners to improve accessibility in the city. The city authority has the willingness to collaborate with wide network of university professionals, city staff and PWDs. This network has taken almost the form of a movement with a goal to make the city universally accessible. It was the 2019 winner of the "Access City Award" and is thus a source of inspiration for cities in Europe and beyond.

2.7.2 Example 2: Kaposvar, Hungary

Kaposvar has a population of 62,446 people and the origins of the city dates back to 5000 B.C. The city is divided by the Kapos, a river with hills rising on both sides. This has been a major challenge to accessibility. The city has however, been improving accessibility in the built environment for more than 28 years now. The city's commitment to accessibility is set out in its urban policy programme named 'We believe in each other'. It is an approach which recognizes that an accessible city is good for everyone. The city has an equal opportunities forum involving a range of disability organizations (EU, 2018).

Figure 11. *Left: accessible streets in Kaposvar (Access City Award), right: central space of city of Kaposvar accessible to all (Carp World championship, 2017)*

The municipal partnership covers a range of sectors including public spaces, services and transport. Issues of accessibility to them are addressed through collaborative working between PWDs and the city's experts. From these collaborative works, new solutions arise from exchanging ideas and best practices, such as voice activated traffic signals. Along with physical and structural improvements to accessibility, the city gives priority to ensuring employees in all areas of public service are trained to understand the needs of PWDs. This includes arranging meetings between public sector employees and PWDs to discuss their needs and priorities and to identify possible improvements (EU, 2018).

Kaposvar has a policy to ensure that no decisions affecting PWDs are made without their involvement. During the development of accessibility measures, the city always includes representatives of disability organizations and a rehabilitation engineer. On "Access City Award, 2019" the city was awarded special mention by the European Union for its continuing efforts to improve accessibility.

2.7.3 Example 3: Vigo, Spain

Vigo, a city in Spain, has a population of 296,479 people. It dates back to the 8th century B.C., but today Vigo is a modern city with a large urban infrastructure surrounded by rural areas. It is committed to transforming a city with traffic into one that is easy to navigate and open to all.

One of the major initiatives taken by the city is addressing the balance between motorists and pedestrians by making roads narrower while extending pedestrian areas. The use of tactile guidance and warning surfaces has been introduced as the common standard with

improved signage. Traffic lights are equipped with a Bluetooth system that can be activated at the lights or by using a mobile app, which eases navigation. All city buses are accessible for people with all kinds of abilities and include audible and visual information as well as facilities for wheelchair users and persons with limited mobility. Besides that, PWDs and their companions get free public transport services. One of the taxi companies, the Bono-Taxi particularly helps PWDs and older people living in rural areas to get around the city. According to the city's rule, more than one parking space must be reserved for PWDs out of every 40 non-reserved spaces and there is no time limit on parking for PWDs. The city police ensure that the parking badges for PWDs (the Blue Badges) are not abused or misused.

Vigo Vertical

The city is characterized by steep slopes which have been a real challenge to accessibility and standard accessibility solutions do not work because of the gradients. To address the problem, the city has undertaken a project called 'Vigo Vertical' which takes several initiatives to connect the areas divided by the slopes. In 2016, the first urban lift was installed and additional three are now being introduced. The streets pattern is concentric and at different levels, they are now connected by lifts which allow PWDs and elderly people to move independently between the levels. This intervention has reduced the height differences between the areas by 10-20 meters.

Figure 12. *Escalator on 2nd Republic Street that joins the Puerta del Sol with the Mount del Castro in Vigo, Spain (Access City Award 2019)*

Accessibility in the city is continuously monitored by experts from the Galician Confederation of PWDs. Along with this, the town hall offers awareness raising activities and training sessions to show people what life is like for a wheelchair user or a person with sight loss. The city works with accessibility experts and in particular with the municipal council to represent the disability organizations in the city and address accessibility in Vigo. There are various programmes organized to make people and policy makers aware about the needs of PWDs. An annual 'Mobility Week' is organized in collaboration with the disability and cycling organizations to demonstrate the importance of universal design in creating a city for everyone.

Figure 13. *Accessible large city centre and alleys (Accessible Spain Travel)*

Since city planners and designers are the people mostly responsible for making the city and its infrastructures accessible, the city government conducts trainings about universal design for them. Accessibility specialists are also included in all planning meetings. Furthermore, in all improvement works of the city, it always ensures that the pedestrian always takes precedence. An example of it includes extending the cycle lane throughout the town in order to separate of cycle ways from pedestrian streets. In the future, Vigo plans to continue the 'Vigo Vertical' project that is based on the principles of universal design and which will ultimately make the city accessible, livable and a relaxed living space for all.

The city of Vigo was awarded 'Access City Award 2019' by the European Union, with a special mention for its innovative approach to accessible architecture in an area of challenging topography.

2.8 Example of accessible urban development in the national context

In the context of Nepal, one struggle to find even a single public place, let alone an urban area, which is fully accessible to PWDs. PWDs in Nepal face barriers in every step of their

lives, whether physical, social or institutional. When a person with disability steps out of her house, she faces obstructions and barriers starting right from her door step. From building entrances to sidewalks, and from road crossings to bus stops, infrastructures and public spaces in Nepal are full of obstructions and barriers that restrict the movement of PWDs. While some public spaces, city areas and infrastructures may have some provisions for increasing accessibility to them for PWDS, they are however, never continuous which renders them unusable. To understand how the requirements of accessibility in public spaces for PWDs are being attempted to meet in the context of Nepal, an example is taken from the premises of Khagendra Nawajeevan Kendra in Kathmandu where some interventions have been made to make its environment accessible for PWDs**.**

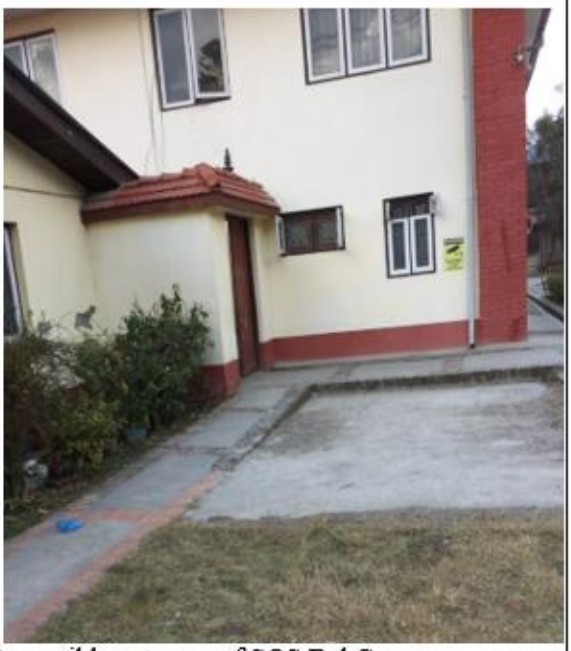
Figure 14. *Left: ramp in crossing of the road; right: pathways used by wheelchair user in Khagendra Nawajeevan Kendra*

Located in Jorpati, Kathmandu, some 3.6 km away from Chabahil Chwok, the premises houses various organizations such as Nepal Disabled Organization, SOS Balgram, Nepal Orthopedic Hospital and Bodhisattvas, which work on rehabilitation of PWDs including children and on providing livelihood trainings and special programs enhancing the rights of PWDs. The condition of the access road from Chabahil to the hospital is so poor that it seems almost impossible for a PWD to move even a meter on it. The planning of the access road is said to be an ongoing process. The parking of the hospital area is also very poor. In this premises, approximately 150 wheelchair users and 10 visually impaired people move around every day. Inside the premises, attempts seem to have been made to make pathways and sidewalks PWDs-friendly with the construction of ramps on crossings and building entrances, and in between garden areas and roads. At least within the premises, such

pathways and sidewalks seem to make it easy for wheelchair users to move around. Pathways are even and have low gradients so that the wheelchair users do not have to apply extra effort to move around. Although many parts of the premises are much more accessible to PWDs than any other public spaces in Kathmandu or Nepal, it can still not be considered to meet several criteria set by the principles of accessibility and universal design.

Motorized wheelchair used by PWDs

Accessible office building entrance



Accessible entrance of SOS Bal Gram

Accessible hostel entrance

Roads and pathways are provided with accessible ramps which leads to different blocks such as office, hospital, hostels, SOS Bal Gram, etc. All the wheelchair users are easily moving around for their daily activities. There is construction of intersections with PWDs friendly pathways with low gradient ramps. The surfaces of all pathways are stable and contain no tripping hazards. Fine concrete, asphalt and bitumen, bricks and flag stones are used in the pathways.

Figure 15. *Examples of elements of accessibility within the premises of Khagendra Nawajeevan Kendra*

2.8.1 Accessible road design for people with Disabilities, Jorpati

The project "Accessible road design for people with Disabilities, Jorpati" was developed and designed by Kathmandu Sustainable Urban Mobility Forum III for persons with spinal injuries and was initiated by Kanak Mani Dixit in 2013. It was done in collaboration with the Department of Roads and an architectural firm called Design Cell. The main objective of the project was to demonstrate a design of a stretch of a road from Khagendra Nawajeevan Kendra to Jorpati chowk that was accessible for people with disabilities, especially for wheelchair users and the visually impaired. In order to come up with the design, at first, the project conducted a survey of the stretch area from Khagendra Navajeevan Kendra to 100 m away from it towards Jorpati Chwok with the idea of applying the resulting design to the extended 1 km long stretch from Khagendra Navajeevan Kendra to Jorpati Chwok. During design consideration, the project collected information regarding the Right Of Way (ROW) of the road and requirements of PWDs. PWDs were involved in every stage of the design and implementation phase and they were happy about this initiation. The design was prepared following the accessible design standards as well as by understanding needs and features of the sidewalks in Nepali context. For example, the sidewalks had provision for hawker stalls at every 100 m intervals. Although, the design was approved and implemented in the stretch area from Khagendra Navajeevan Kendra to Jorpati, a year after its implementation, Nepal government decided to expand the Chabahil-Jorpati road and during the process, all interventions made by this project to make the part of road accessible for PWDs were swiped away.

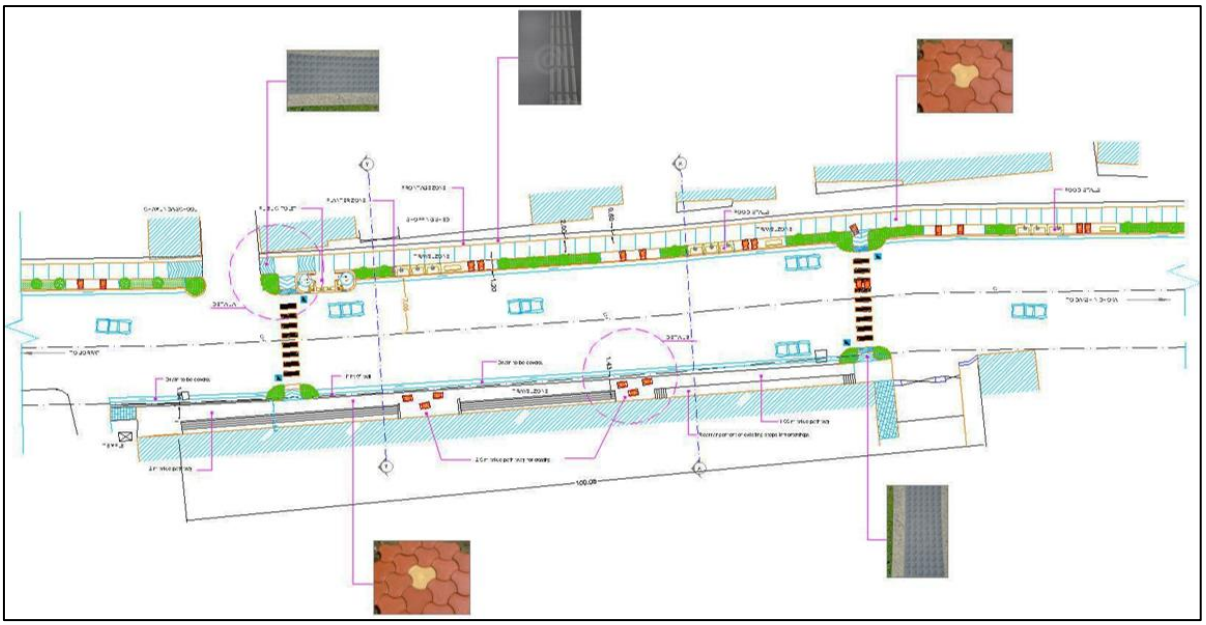


Figure 16. *Proposed accessible road for PWDs (Design Cell)*

According to architect Anjan Raj Shrestha who was a member of the project, the design was made by incorporating concepts of sustainability, visibility and accessibility. The design has been done in a comprehensive way with focus on details of all elements of accessibility of sidewalks and pedestrian crossings. It was designed based on accessibility standards; for example, sidewalks were with a minimum width of 2 to 3 m. The 3 m sections were provided to rest wheelchairs. The sidewalks were divided into four different zones; frontage zone, pedestrian travel zone, planter/furniture zone and kerb zone. Continuous tactile tiles- both directional and warning, needed for visually impaired people, are also present along the stretch of the sidewalks. Pedestrian crossings were designed with ramps in sidewalks, kerb ramps, resting platforms and warning tiles on the pedestrian waiting areas in crossing. Crossings were managed in such a way that the pedestrians would be visible from any vehicle in the road. Sidewalks were also provided with a green belt which acts as a buffer between sidewalk and vehicular road.

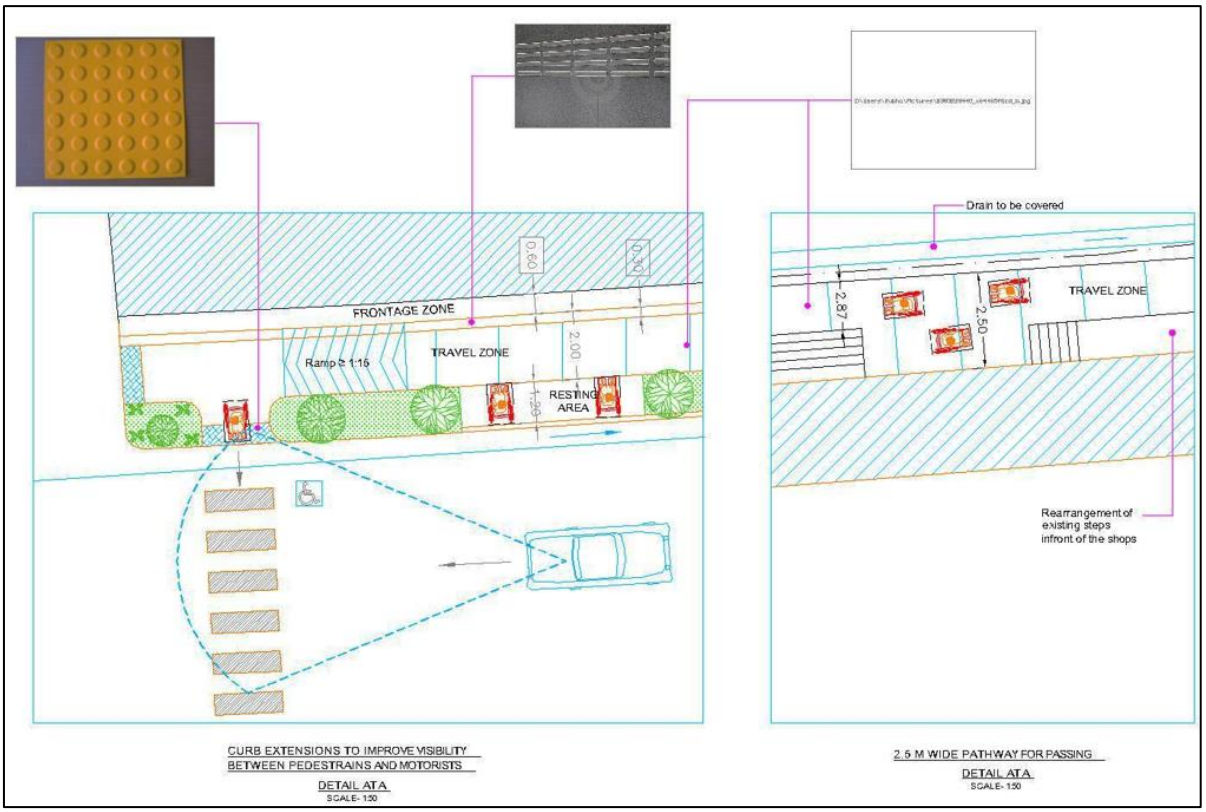


Figure 17. *Detail of pedestrian crossing and resting space for wheelchairs (Design Cell)*

Despite once being planned, designed and built (2014) in coordination with the government of Nepal, these structures providing accessible sidewalks were later removed in the name of road expansion. This shows the poor coordination and lack of vision for the future on part of the concerned authorities and policy makers as well as their apathy towards the needs of PWDs regarding their accessibility to public spaces.

2.9 Summary of parameters of accessibility and universal design

From the extensive literature review made during the process of making this research work and as demonstrated in sections 2.1 to 2.8 in this document, a summary of the principles of Universal Design against some of the parameters of accessibility can be drawn, as shown in Table 2 below.

Table 2. Parameters of accessibility and principles of universal design

Parameters / Universal Design	Side Walks	Bus Stops	Pedestrian Crossings	Subways/ Foot Over Bridge	Entrance of public buildings
Equitable Use Planning is useful and marketable to people with diverse abilities	Appropriate height Appropriate Width Ramped entry and exit	Bus stops that are sheltered with ramped entry and exit, and with tactile markings on the ground Seats that can be used by a variety of users	Road dividers that are not too high and have spaces designated for pedestrians to stand Traffic lights that also have auditory cue	Ramped entries in addition to stairs	Main entrance with ramp
Flexibility in use The design accommodates wide range of individual preferences and abilities	Kerb Cuts to disembark if someone wants to, whether on foot or on wheelchair Ramped entry and exit if they cannot climb the high sidewalks	Information system that involves signage, auditory cues and tactile information for the benefit of all users	Spaces where pedestrians can stand for while crossing roads should be wide enough to accommodate wheelchairs and should have kerb cuts	Tactile paths and proper signage	Main entrance with ramp
Simple and intuitive use Use of the design is easy to understand regardless of the user's experience, language skills or concentration level	Tactile markings which are continuous and have warning blocks wherever there are obstructions give effective cues and prompts during walking	Use of pictograms, information about routes Bus stops with tactile markings	Zebra crossings that are clearly marked in white Traffic lights with provision of auditory cues	Use of directional pictograms and auditory cues	Use of signage and auditory signal

Perceptible information The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities	Tactile paths that inform of any impending obstruction	Names of bus stops are mentioned clearly Use of Braille, auditory cues and live feeds for route information Tactile markings at the stops	Signposts of zebra crossings so that both pedestrians and approaching vehicle users can see Colour of road dividers is in high contrast, i.e. either black and white or yellow and black Wherever there are crossings, there should be kerb cuts at the sidewalks and tactile indicators to indicate such Use of auditory cues	Tactile paths, signage and auditory cues to assist diverse users	Use of signage and auditory signal
Tolerance for error The design minimizes hazards and the adverse consequences of accidental or unintended actions	Sidewalks that are even and continuous with no encroachments and obstructions Bus stops and taxi stands are connected to the sidewalks	Stops are not obstructed and have warning blocks wherever there are obstructions Stops are connected to the sidewalks	Dividers are well maintained with spaces to stand for crossing and if the dividers have trees or fences, they should neither affect visibility nor should act obstructions	Well maintained subways with proper lightings and safety features	Appropriate width of entrance door
Low Physical Effort	Sidewalks of appropriate height that can be used without discomfort and fatigue	Ramped entry and exit and buses stop at the stops aligning the buses to their height so that passengers can get on the buses easily Seats for bus stop users while they are waiting for buses	Dividers that are not too high for comfort Request crossings so that the old people or PWDs do not have to stand waiting while crossing the roads	Provision of lifts, ramps or escalators in addition to stairs	Ramp with 1:20 ratio

Size and Space for approach and use Appropriate size and space is provided for approach, reach, manipulation and use regardless of user's body size, posture or mobility	Sidewalks that are not too high to use for old people, children, people with luggage and wheelchair users, and have ramped entries and exits. Sidewalks should be wide enough so that one can use it if she/ he has luggage, is walking with kids, is a wheelchair user or has a white cane. Sidewalks should be obstruction-free so that the original widths remain intact	Bus stops that are built little away from the sidewalks Bus stops that have ramped entries and exits	Road dividers that are not too high to use Zebra crossings are marked at places where there are kerb cuts to get off and on the sidewalks Traffic light signals whose visibility are not obstructed by the presence of trees or other physical structures	Constructed little away from the sidewalks so that their widths are preserved and marked with some tactile information and signage indicating underground pedestrian crossings	Ramp should not be more than 1:12 and minimum width more than 1.8 m

Furthermore, a checklist as shown below in Table 3 is drawn for conducting field survey in which observations about various elements of accessibility to public spaces for PWDs are made.

Table 3. Checklist for field survey extracted from literature

S.N.	Sidewalk	Bus stops	Pedestrian crossings	Subways/foot over bridge	Building entrance	Parking
1	Warning blocks	Tactile marking	Presence of zebra crossing and clearly marked	Entry to the subway/bridge Stair with ramp	Ramped entry	Provision of signage
2	Tactile marking leading that does not lead to holes or any other obstruction	Accessible signage	Auditory signal	Signage	Connection to sidewalks	Adequate marked out clear space
3	Continuous	Kerb cuts	Road divider	Auditory cue	Connection to bus stops	Connection to pathways
4	Evenness of the surface	Ramped entry and exit	Directional and warning markings	Directional information		One designated parking space within 50 m
5	Kerb height and width	Live feed and route information	Even and non-slippery surface	Provision of lifts or elevators		Leveled ground
6	Encroachment	Auditory information	Ramp gradient less than 8%	Ramp slope not more than 5%		Gradient not more than 1:50
7	Obstructions	Seats	Level difference between sidewalk and crossing not more than 20 mm	Intermediate landings		

3 RESEARCH METHODOLOGY

Research is a systematic and organized effort to investigate a specific problem that needs a solution (Serkern, 1992). It is also the study of materials and sources in order to establish facts and reach new conclusions. The exact nature of the definition of research is influenced by the researcher's theoretical framework and way of looking at the problem which is called paradigm. Paradigm is a broad framework of perception, understanding, belief within which theories and practices operate (Lecture notes, 2019). Without nominating a paradigm as the first step, there is no basis for subsequent choices regarding methodology, methods, literature or research design. There are various types of paradigms such as positivist, post positivist, interpretivist/constructivist, transformative and pragmatic. The research paradigm is selected using the process of selection by rejection.

Positivist paradigm aims to test a theory or describe an experience through observation and measurement in order to predict and control forces that surround us (O'Leary, 2004). Positivist and post-positivist research is aligned with quantitative methods of data collection and analysis. Since the research presented in this document is not accompanied with quantitative data collection, it does not fit into this paradigm.

Constructivists or interpretivists do not generally begin with a theory (as with post positivists); they rather generate or inductively develop a theory or pattern of meanings throughout the research process (Creswell, 2003). It has intention of understanding the world of human experience and believes that the reality is socially constructed and therefore, reality needs to be interpreted. Constructivist or interpretivist paradigm relies on qualitative data collection methods and analysis or a combination of both qualitative and quantitative methods (mixed methods). Based on the development of theory and data collection method, the research that is being presented here best fits in the constructivist or interpretivist paradigm. The recommendations in the research are developed over a time after studying the challenges faced by PWDs and their characteristics. The research also includes the findings of various reasons that have created inaccessible public spaces. Information after direct observations, semi structured interviews and key informant interviews conducted during the research is interpreted to analyze the problems and challenges faced by the PWDs.

A descriptive research starts with a well-defined issue or question and tries to describe it accurately (Neuman, 2014). The research presented here will also be based on a descriptive research design. It involves observation and description of nature of reality and

characteristics of the problems. It aims to describe the actual challenges faced by the institutions (e.g. Kathmandu Metropolitan City (KMC), Department of Roads (DOR) etc.) to implement accessible public spaces.

Ontology is the study of reality which exists. It is a system of belief that reflects an interpretation by an individual about what constitutes a fact. It is the starting point of all research and the image of social reality upon which theory is based. Ontological assumptions are concerned with what we believe constitutes social reality (Blaikie, 2000). The ontological position are claims and assumptions that are made about the nature of social reality, claims about what exists, what it looks like, what units make it up and how these units interact with each other. Constructivism is based on ontological position which asserts that social phenomena and their meanings are continually being accomplished by social actors (Dudovskiy, 2019).The ontological position of this research that lies within the interpretivist/constructivist paradigm stems from the fact that the research intends to study the reality that public spaces such as sidewalks, bus stops, pedestrian crossings, parking spaces and public building entrances are giving hardships to PWDs by limiting their movement by creating physical barriers. So, the physical condition of public spaces and problems faced by PWDs are known through empirical observation and people's opinion.

Epistemology is one of the branches of philosophy that deals with the theory of knowledge. It claims that what is assumed to exist can be known (Blaikie, 2000). It deals with the possible ways of gaining knowledge of social reality. In this research, information is extracted through direct observation, semi-structured interview, key informant interview and field surveys. Researcher's valid source of knowledge is the interaction with PWDs about their problems in using public spaces and their view of actual needs to make public spaces accessible. Information regarding what the responsible organizations are actually doing to make public spaces accessible to PWDs is obtained from interviews with concerned personnel from organizations like National Federation of Disabled- Nepal (NFDN) and authorities like City Planning Commission (CPC), KMC and other activists who are contributing their knowledge to make public spaces accessible. Interpretation of literature review is done to know the international and national practices on accessibility and accessibility guidelines. The information regarding issues, problems and challenges faced by PWDs are gained by direct observation, questionnaire survey, Focused Group Discussion and key informant interviews. The data sources for plan, policies and guidelines are

documents obtained from and interviews conducted with key informants from NFDN and KMC.

Methodology refers to general principles which underline how we investigate the social world and how we demonstrate that the knowledge generated is valid. This research is of qualitative type. Qualitative research is used to uncover trends in thought and opinions and dive deeper into the problem. It provides insights into the problem or helps to develop ideas or hypothesis for potential quantitative research. It is observing through the eyes of someone else using an open research question.

Research methods refer to the more practical issues of choosing an appropriate research design. It may be an experiment or a survey. It is used to answer a research question and then to design instruments to generate data. In interpretivist paradigm, both qualitative and quantitative methods i.e. mixed method is used. Qualitative data is utilized to support or expand upon quantitative data and effectively deepens the description. In this research, primary data were collected through direct observations, questionnaire surveys, key informant interviews with PWDs and authorities, and by taking photographs and measurements. Direct observation was done by dividing the area of study into nine different zones and recording in a data sheet the time the observation was made, the number of PWDs encountered, their nature of disability and the way the zone was used by public in order to extract in detail the present physical condition of the public spaces and problems faced by PWDs. Similarly, secondary data were collected from previous studies, reports, books, journals, etc.

4 AREA OF STUDY

4.1 Introduction to Kathmandu

Kathmandu valley is the most populated urban region and one of the fastest-growing urban agglomerations in South Asia (Muzzini & Apericio, 2013; Ministry of Urban Development (MOUD, 2015). Population of Kathmandu valley covers 24 percent of the total urban population of Nepal. Kathmandu Metropolitan City alone accounts for 9.7 percent of urban population (MOUD, 2015). According to 2011 Census, it has a population of 1,426,641.

With the history and culture dating back 2000 years, the cities within the Kathmandu valley rank among the oldest human settlements in the central Himalayas. It shares characteristics with many other rapidly urbanizing cities in the region. These include unregulated urban development; inadequate enforcement of land use policies, poorly maintained city infrastructures etc. Furthermore, it also suffers from massive influx of people from surrounding rural areas and hinterlands, land speculation, excessive pressure of commercial activities and gaps in supply and demand for basic services. Rapid urban expansion coupled with unmanaged settlement development has led to various socio-environmental challenges. Such challenges create severe socio-environmental consequences including poor infrastructures, low quality of life and rise in urban divide.

Kathmandu has a historic tradition of urban public spaces, which range from the central processional squares to the semi-private family squares (Shrestha, 2004). Urban public spaces have historically played a significant role in social, cultural and economic activities of the people living in the valley. Sidewalks of the valley play a remarkable role in the movement of pedestrians by enhancing the livable environment and network of the city.

Rapid growth of urbanization has occurred due to rural-urban migration into the valley. Lack of employment opportunities, education, health, etc., has compelled people to migrate towards the city. The portion of the population of PWDs among the population of Kathmandu valley is relatively significantly higher than in other parts of the country as they

are forced to migrate into the valley to escape the hardships of rural life and search for easier a livelihood where their basic needs are more accessible. However, due to prevalence of poor physical infrastructures and public spaces, they still face significant barriers to their daily lives in the valley. Such a situation which has limited the mobility and ease of access of PWDs in the valley has led to their social exclusion.

4.2 Selection of study area

Problems related to accessibility for disabled people are known through researcher's own empirical observation. The topic is selected so that an in-depth study of the problems and challenges faced by disabled people in an urban area like Kathmandu can be made and suitable solutions to overcome such challenges can be proposed. The problems of accessibility for PWDs are similar all over Kathmandu valley and there aren't any localities where PWDs can move around freely and with ease.

Figure 18. *Demarcation of study area*

For the purpose of a specific study in this research, the stretch area from Sundhara to Ratnapark, one of the busiest areas of the city, is taken by the researcher. Streets around Ratnapark are one of the most crowded ones in the capital- the streets absorb everyone including the ordinary and the PWDs as the area lies in the center of Kathmandu and the streets not only serve the variety of functions related to people's daily lives but also provide gateways to many attractions in the area. It is one of the largest designated open spaces in Kathmandu Valley and includes the Tundikhel, Old Bus Park and Ratnapark. Although the study is focused only on this area, the findings and proposed solutions can be well extended and applied to the whole of Kathmandu valley in a broader perspective.

4.3 Profile of the study area

The study area is located at the centre of Kathmandu near old historic settlements such as Kathmandu Durbar Square, Ason, and New Road. The study area serves as a center of commercial, cultural, and recreational activities as it is easily accessible from all parts of the Kathmandu valley. Public transport is also easily available to different parts of Kathmandu valley from this area of study. As the area is near commercial hubs such as New Road and Ason, the streets around Ratnapark and Sundhara are used by a large volume of pedestrians that use public transport from the area. Similarly, Kathmandu Durbar Square is also only 500m away from the study area and thus users of pedestrian streets around the area include children, tourists, old people and PWDs among others.

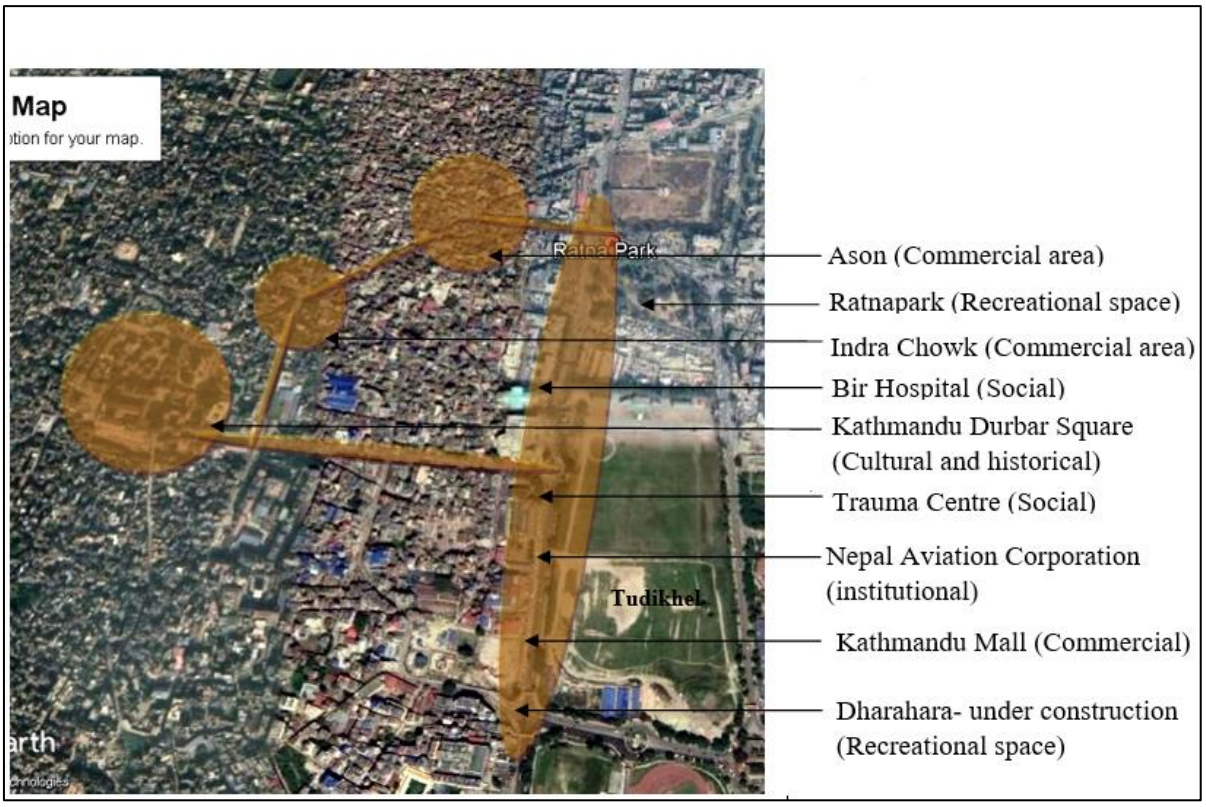


Figure 19. *Land use plan of the area of study*

The stretch area includes various public spaces such as Dharahara which is under construction, Kathmandu Mall, Nepal Aviation Corporation, Trauma Centre, Bir Hospital, Tundikhel (open space) and Ratnapark and therefore connects people to both major commercial sites as well as historic places. The users of the study area also have different kinds of abilities.

4.4 Micro accessibility of the study area

The study area acts as a commercial, transportation and recreational hub of Kathmandu Metropolitan City. The public spaces are interconnected by a major street i.e. the street around the Tundikhel. The study area connects commercial areas like New Road, Indrachowk, Ason, Mahabaudhha, Khichapokhari, etc to the people from Kathmandu valley. Many people also use this street for their daily activities. This street acts as a major conduit of access to public buildings like hospitals (Bir Hospital and Trauma Center), shopping malls, government buildings and connects them to the transportation network of Kathmandu valley. Even though in the macro level, the public spaces along the street are accessible by public transportation from all over the valley, in the micro level, linkages to services and

public space in the area of study are, however, not accessible to PWDs because of physical obstructions in the built environment and presently available infrastructures.

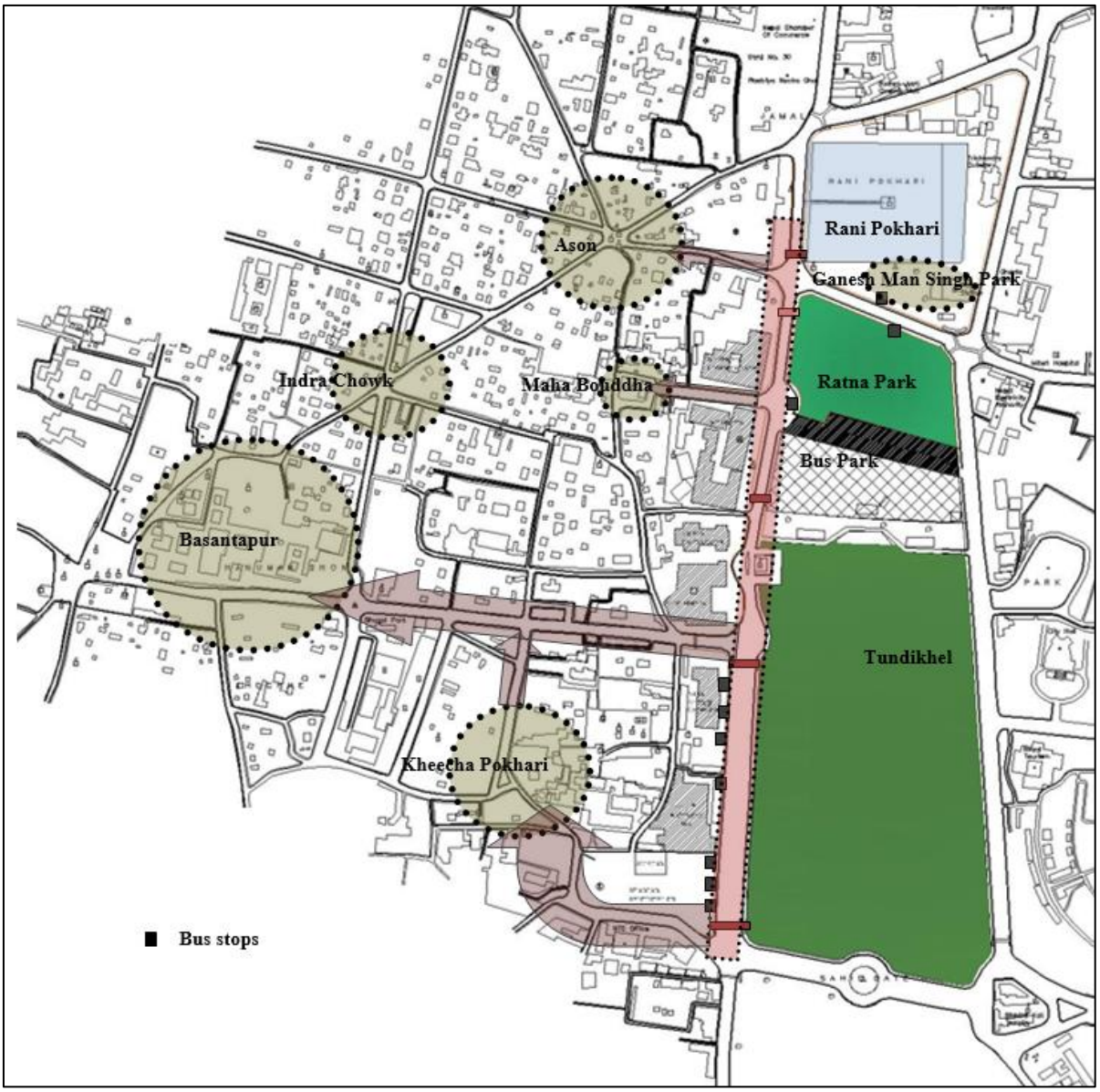


Figure 20. *Inter-linkage between the services and public spaces in the area of study*

5 DATA AND DISCUSSION

5.1 Observation of study area

The study area was divided into nine zones on the basis of provision of services and use of land (Figure 21). Each zone of the stretch area was visually observed, and a data sheet was prepared to record and find out the frequency of use by PWDs in each zone. The data sheet can be found in Appendix 2.

Figure 21. *Division of the area of study for observation; the size of the bubbles are proportional to the number of PWDs observed in the zone*

5.2 Frequency of use by PWDs

As the study area is located at the commercial centre and is easily accessible from all parts of Kathmandu valley, the flow of people in this area is relatively high. Pedestrian groups also include children, elderly people and PWDs in a significant portion. Just like PWDs, children and elderly people can also in some way be considered a group which requires additional means of accessibility, as a child cannot walk without parent's help, and an elderly person often requires a stick to move around. PWDs have to rely on crutches, wheelchairs, walking sticks, etc. to move around. Along with able people, this group of people not only uses sidewalks but also pedestrian crossings, bus stops and sub ways or foot over bridges.

To find out the frequency of use by PWDs, direct observation and questionnaire survey was made. During the observation, 5-6 PWDs were found to be using public spaces every hour. According to one of the Traffic Polices, during his duty of 3 hours, 50-60 PWDs were passing by him using sidewalks, crossings and even vehicle roads. Among them, crutch users and visually impaired people seemed to outnumber the wheelchair users.

Figure 22. *PWDs using public spaces in the area of study*

The flow of PWDs in the area must also have been significant because of the presence of Bir Hospital in the area of study. Many PWDs seemed to seek help from traffic police in

crossing roads. It could easily be observed that PWDs had to put extra effort to move on sidewalks, to get to bus stops and to cross roads.

5.2.1 Nature of disability

When a questionnaire survey was conducted amongst the PWDs in the area of study, it was found that the majority of PWDs i.e. 40% had mobility disability using crutches, followed by the visually impaired at 25.7%, the ones with mobility disabilities using wheelchair at 22.9% and the ones with low vision at 11.4% (Figure 23). The fact that the majority of the PWDs found in the area of study were crutch users is probably due to the presence of health services like Bir Hospital, National Trauma Centre, and the Army hospital in the area.

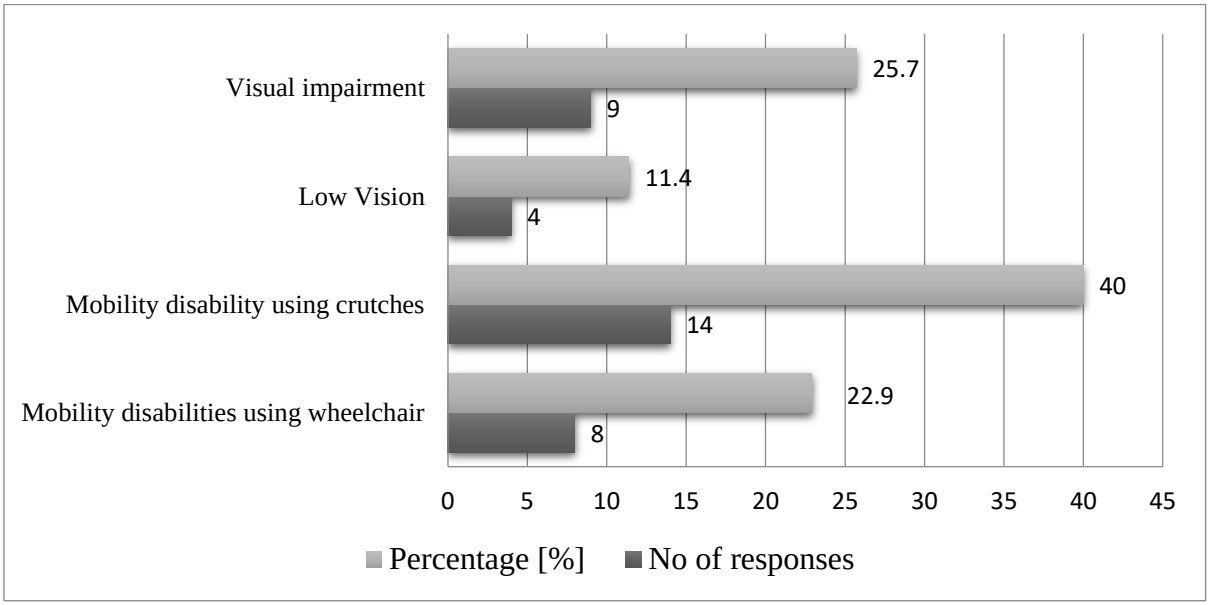


Figure 23. *Nature of disability of the PWDs using public spaces in study area*

5.2.2 Age group and gender

The majority of PWDs surveyed i.e. 31.4% were in the age group 20-30 years, followed by age group 30-40 years (22.9%), 40-50 years (20.0%), 50-60 years (11.4%), 10-20 years (8.6%) and above 60 years (5.7%), as seen on chart in Figure 24. Respondents below 10 years of age could not be found. This shows that most of the PWDs found using the area of study are from economically active groups and are physically stronger compared to those of other age groups.

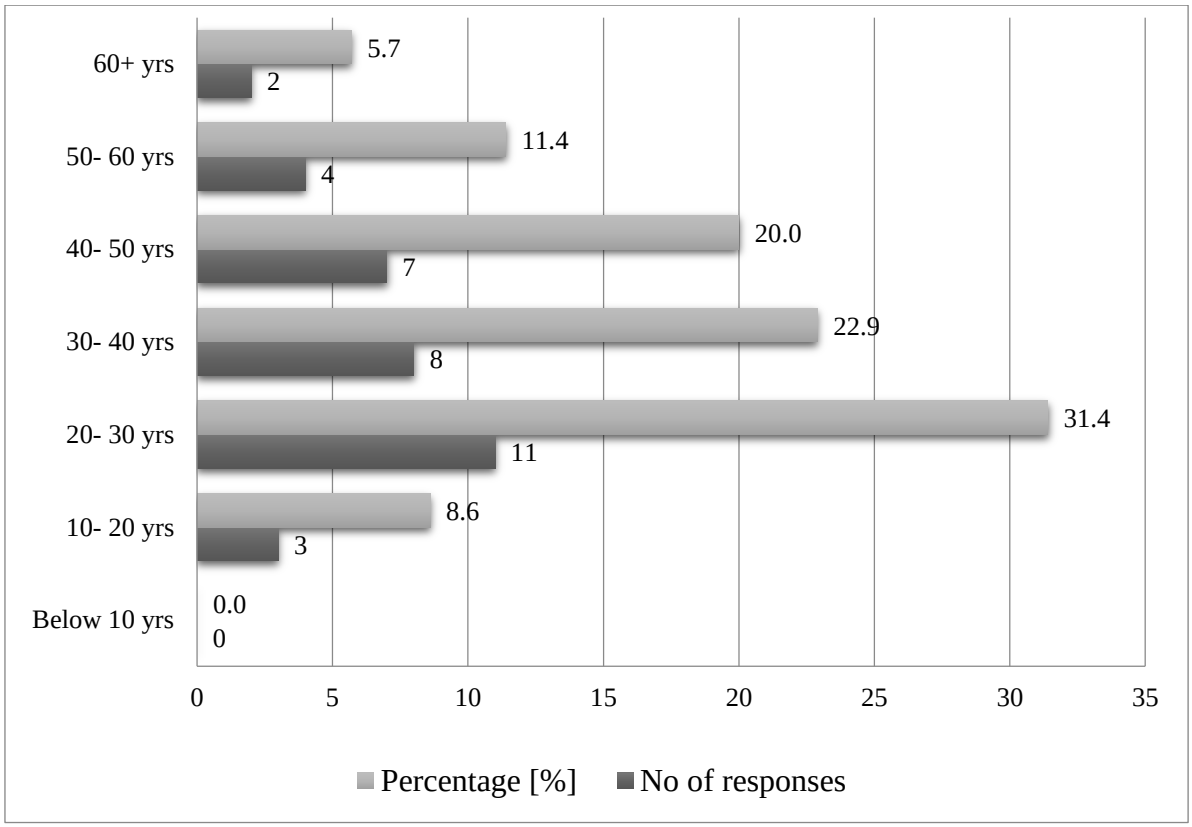


Figure 24. *Age group of PWDs found to be using the public spaces in the area of study during survey*

When it comes to gender, majority of PWDs responding to the questionnaire survey were males at 69.4%; and the females made up the rest with 30.6% (Figure 25). A possible explanation for the female PWDs to be found using the public spaces in the area of study less frequently than their male counterparts could be that they do not feel as safe in the public spaces and that they also represent the economically less active gender group found otherwise in the society in general.

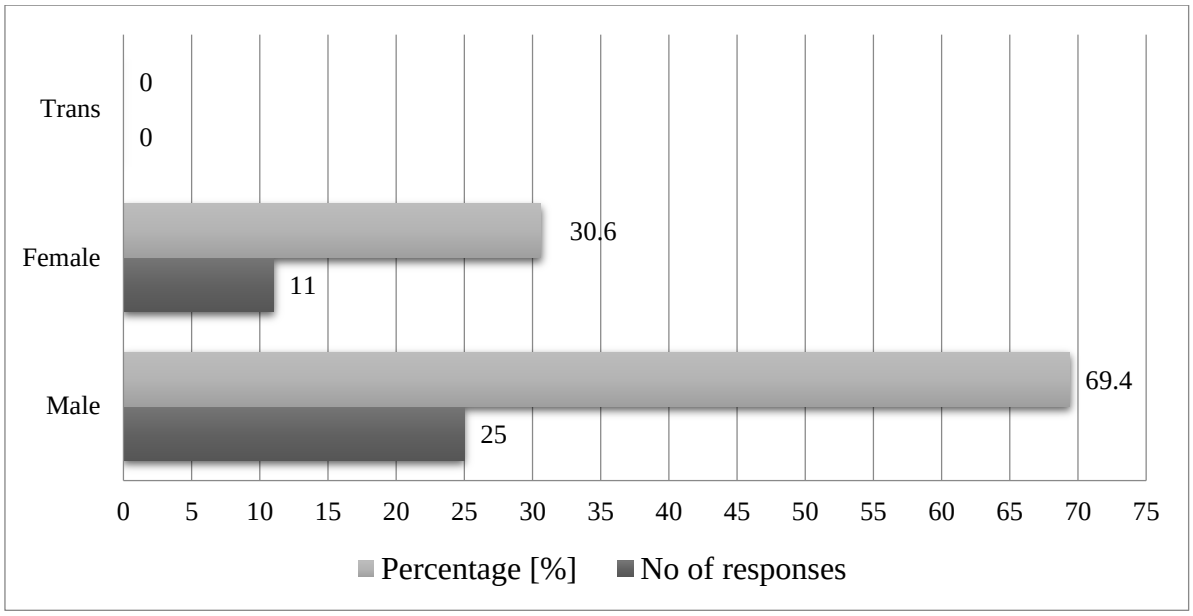


Figure 25. *Composition of respondents to questionnaire survey by gender*

5.2.3 Education and employment

During the survey, it was found that the majority of the PWDs were literate (i.e. 34.3%), followed by the PWDs who had completed secondary level of education at 28.6%, those with higher secondary level education at 11.4% and those with primary level education at 5.7% (see Figure 26). Respondents who considered themselves illiterate were found to be at 20%. A lack of university degree graduates and high percentage of illiterate PWDs goes to show that a significant portion of the PWDs is deprived of education because of a lack of physical and social infrastructures that are conducive to their educational needs.

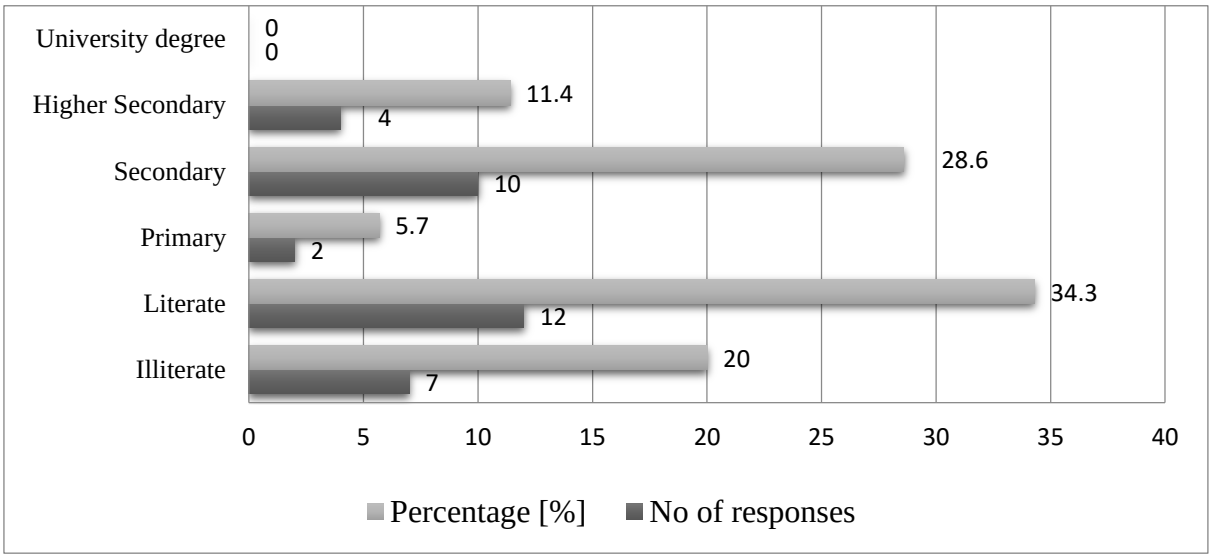


Figure 26. *Educational status of PWDs*

As seen in the chart in Figure 27, the majority of the PWDs during the survey, at 42.9% were found to be unemployed while the second biggest group was that of the self-employed at 28.6%. The rest of the PWDs were found to be engaged in services (11.4%), were students (11.4%) or were working for private firm (5.7%). Although those with some form of employment outnumber the unemployed, the fact that quite a big chunk of the group is left without work shows that they probably lack the necessary education, training, and livelihood skills to become employed and earn their economic independence, as well as possibly also face discrimination in employment opportunities.

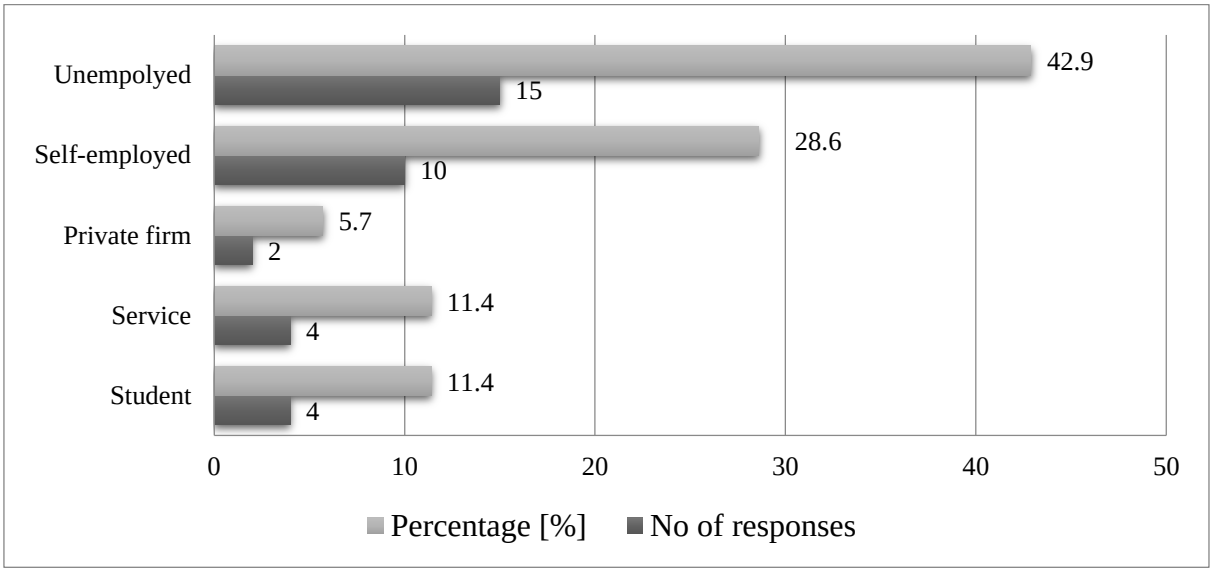


Figure 27. *Employment status of PWDs*

5.3 Mode of transport

The PWDs in the survey were inquired about the mobility device they used to move around. The majority of PWDs, at 40% were found to be users of crutches with the next largest group being the ones who used walking sticks for mobility (at 34.3%). The rest of the PWDs surveyed used manual wheelchairs for mobility while none of the respondents used motorized wheelchairs (Figure 28).

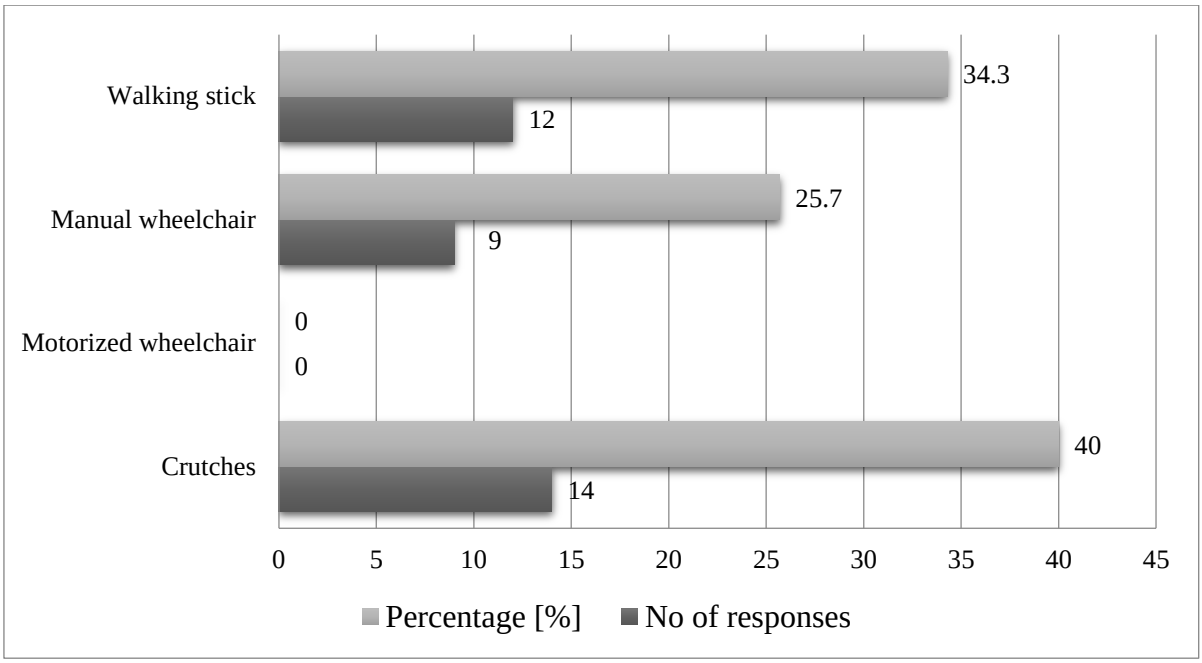


Figure 28. *Mobility devices used by PWDs*

When it comes to the modes of transport, a significant number of the PWDs were found to be using public vehicles such as buses or microbuses (70.3% of them); some 13.5% of them used scooter, for about 5.4% of them wheelchair seemed to be the only option; also 5.4% of them responded as using taxi service and the remaining 5.4% were found to be using walking sticks (Figure 29). The results show that at least for the PWDs encountered in the area of study, public transportation is somewhat a feasible option for them to travel from their origin to the place of destination.

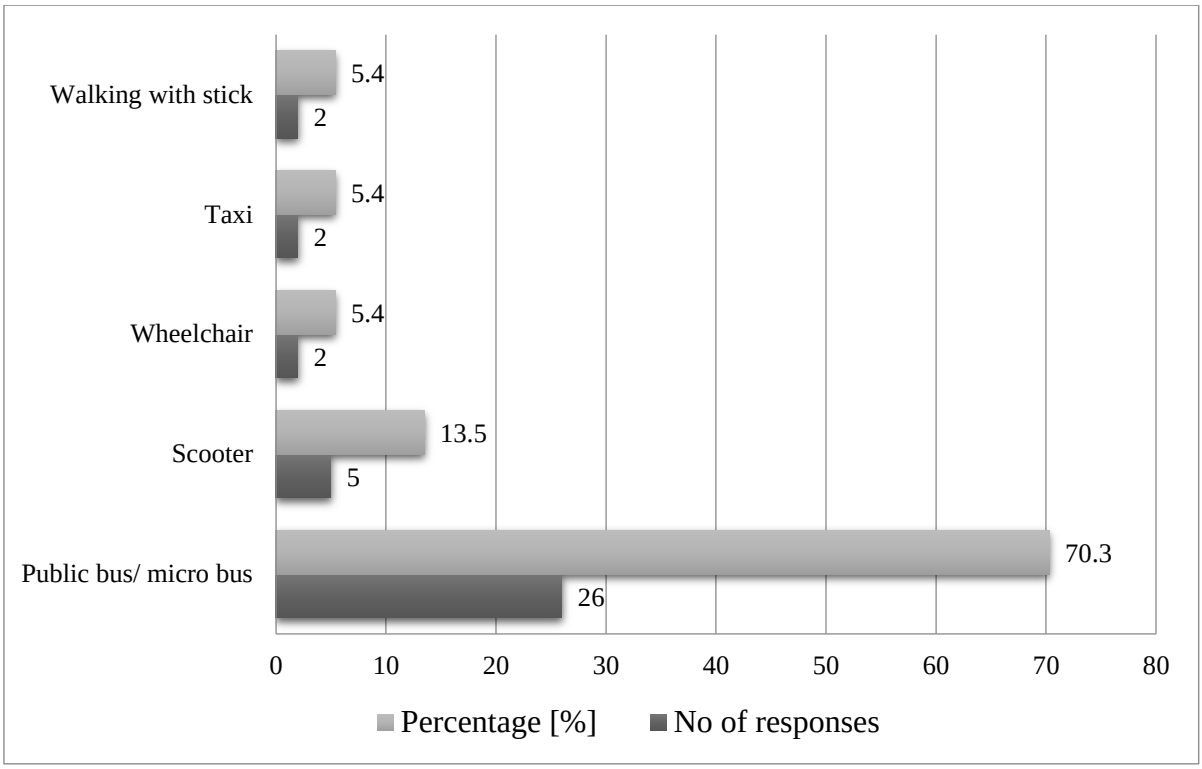


Figure 29. *Modes of transport used by PWDs*

The chart in Figure 30 shows some of the reasons the PWDs cited for using the modes of transport they used for travelling from one place to another. For most of the PWDs i.e. 43.8% of them, means of public transportation like public buses and micro buses were an economical option to them and probably also points to the fact that many of them cannot afford private vehicles to move around. For 26.6% of the PWDs surveyed, public buses or micro buses were safe to use for transportation. For 20.3% of the PWDS, public transportation was in fact, the only available option. The fact that only 7.8% of PWDs feel that public buses are actually easy to board and alight and a significant rest are using them for economic reasons or a lack of other options shows that special attention should be given to improve the accessibility of pedestrian and transportation infrastructures such as bus stops. Respondents often found that public transportation lacked proper information about routes and stops. The service providers such as staffs of public buses were also not helpful to them when asking about routes and stops or for adequate space inside buses.

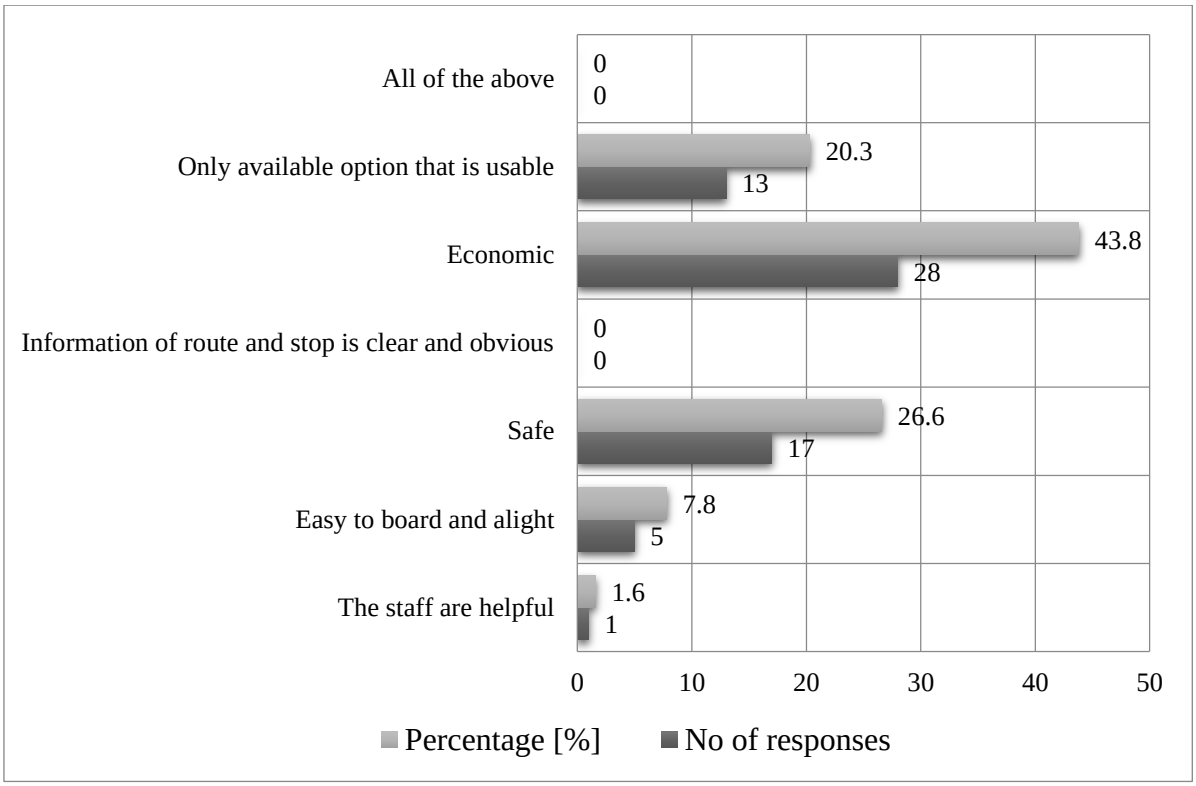


Figure 30. *Reasons for the choice of mode of transport by PWDs*

5.4 Evaluation of existing condition of public spaces

5.4.1 Sidewalks

Sidewalk is the portion of the pedestrian street network system from the edge of the roadway to the right-of-way (property line or building edge), generally parallel to the street. Sidewalks are present on both sides of the road in this stretch area. As the area is located in CBD (Central Business Districts), it accommodates a large volume of pedestrian traffic every day and gets especially crowded during major festivals like Dashain, Tihar, etc. In most of the areas, widths of sidewalks are sufficient but in some, they are too congested for large volume of pedestrian traffic.

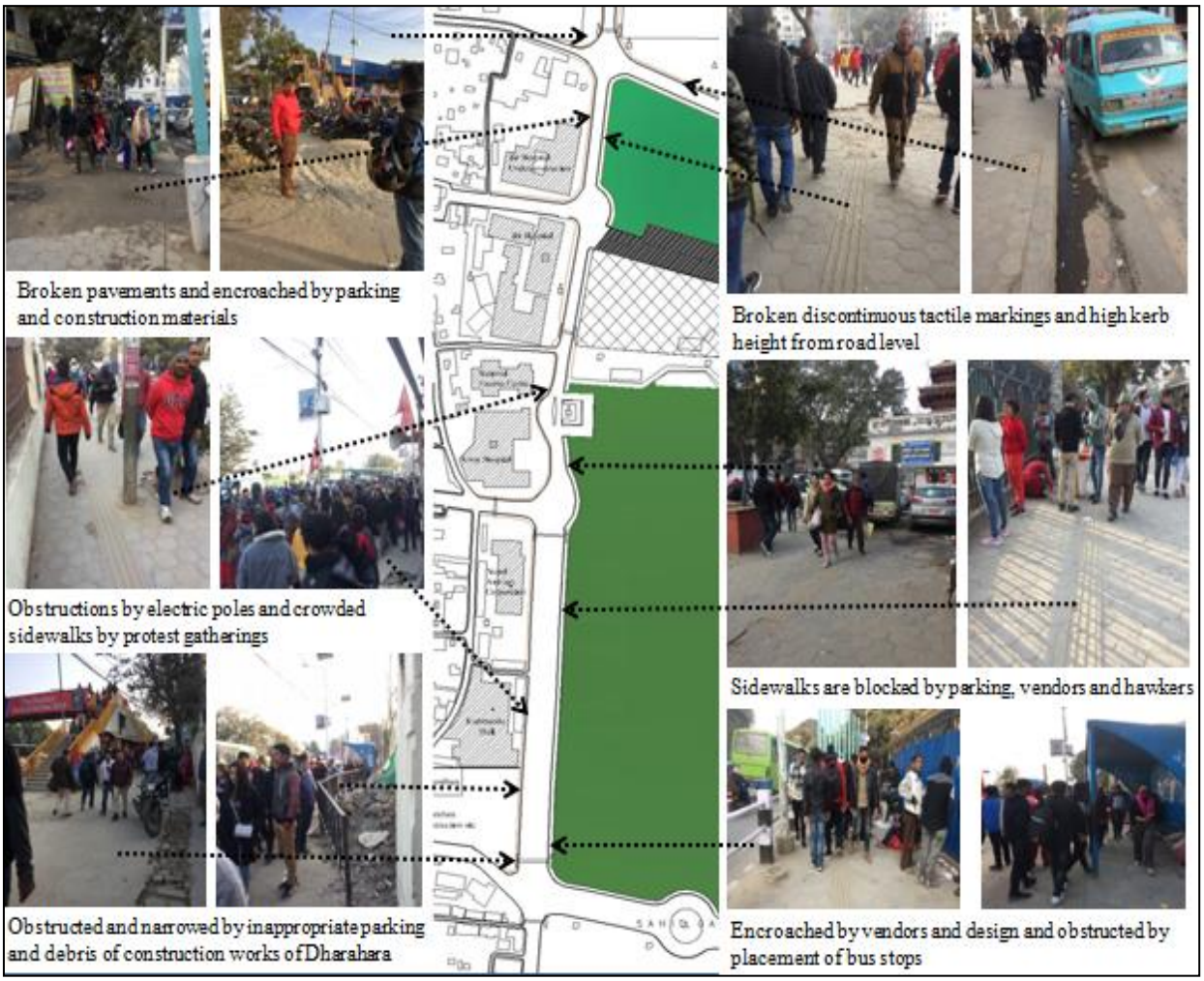


Figure 31. *Obstructions in the sidewalks*

In most parts of the stretch area, widths of sidewalks are sufficient, but in some parts, widths are not continuous and there are many with bottlenecks. For example, sidewalk adjacent to Bir Hospital is wide enough in some places with a width of 4 m but when it comes to near the entrance gate of the hospital, the width reduces to 1.2 m making the space insufficient for two pedestrians to cross at the same time. Haphazard placement of overhead pedestrian bridges in the area has made the sidewalks congested and narrow.

Whatever of the sidewalks are left at the bases of the over- bridges, they are congested, narrow, unevenly paved, and are obstructed by shops under the bridge and haphazard parking, making them difficult to be used by the pedestrians (see examples in Figure 31). During the observation, the sidewalks did not seem to be safe for pedestrians to move freely.

Sidewalks are paved by interlocking concrete blocks but are in poor condition as they seem to lack maintenance. In most of the area, pavement blocks were broken or removed, creating uneven surfaces that might lead to accidents or injuries to crutch or wheelchair users and

visually impaired people. Sidewalks in the study area also have tactile tiles (both guiding and warning tiles) intended for the visually impaired people but they are placed without any planning and are not continuous and often end at obstructions like trees, electric poles, and humps making them a hazard and hindrance rather than help.

The guidance tactile tiles consist of series of elevated, flat topped bars running along the direction of pedestrian streets with contrasting color. The purpose of warning tiles is to indicate hazards such as steps, pedestrian crossings, level difference or any obstruction in the pedestrian ways. Table 4 below compares the existing condition of the sidewalks in the chosen site against the parameters of accessibility.

Table 4. Comparison between existing condition of sidewalks and parameters of accessibility

Parameters	Existing conditions of sidewalks
Safe and comfortable	Obstructions like trees, electric poles, construction materials may cause injuries
Firm surface of pavement	Broken pavements
Continuous	Width is not uniform throughout the stretch area; several bottlenecks present at pathways
Slip resistant pavement	Pavements are non-slippery
Ramps with gradient 1:12 to 1:20 (whichever is suitable)	Level difference between sidewalks and road is high, lack of proper ramps
Ramped kerbs	Level difference between sidewalks and road is high i.e. 230-300 mm, lack of proper kerb ramps
Use of tactile tiles (directional and warning tiles)	Tactile tiles are randomly present, but their placements are haphazard without proper planning and leading to obstructions (i.e. trees, electric poles, bus stops, pedestrian bridges); design of warning tactile tiles do not meet the required standard and are placed in such a way that they fail to serve the purpose of notifying the visually impaired people
Hand rails to prevent falling (as required)	No provision of hand rails
Minimum unobstructed width of 1.8m	Sufficient width in some places (i.e. 5000 mm) but narrow in many places and are obstructed by pedestrian bridges, roads, etc.

Experience of PWDs regarding sidewalks

The majority (i.e. 48.6%) of the PWDs surveyed responded that the sidewalks in the area of study were 'mostly' encroached, quite many (17.1%) felt that they were 'always' encroached while 25.7% said that they were 'rarely' encroached (Figure 32 below). Only few of them, at 8.6%, said that the sidewalks were 'never' encroached. It is clear from the responses that mobility of PWDs in the sidewalks is greatly reduced due to encroachment.

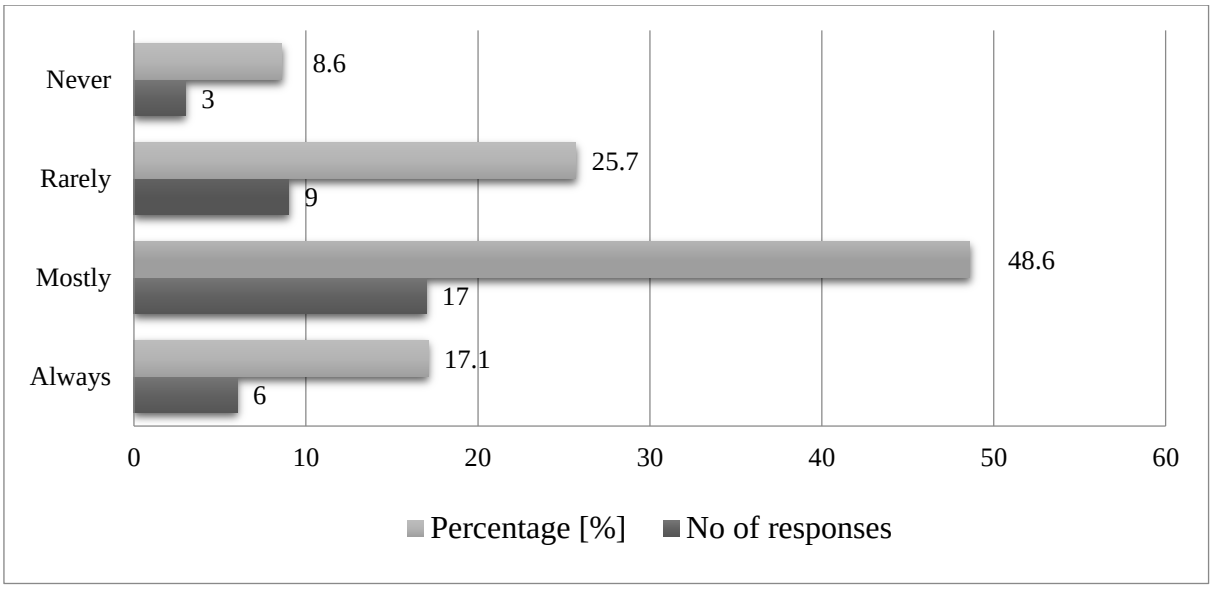


Figure 32. *Number of respondents who felt sidewalks/ pathways are encroached*

According to the PWDs, the sidewalks were mostly encroached by construction works, electric poles, vendors, parked vehicles and trees. The majority of them felt that major encroachments of sidewalks were by vendors in the study area. Upon co-relating the nature of disability and nature of encroachment (Figure 33 below), trees in addition to vendors were the major obstructions for all groups of crutch users, the visually impaired and those with low vision. Electric poles could also be almost equally disturbing to all groups in the sidewalks.

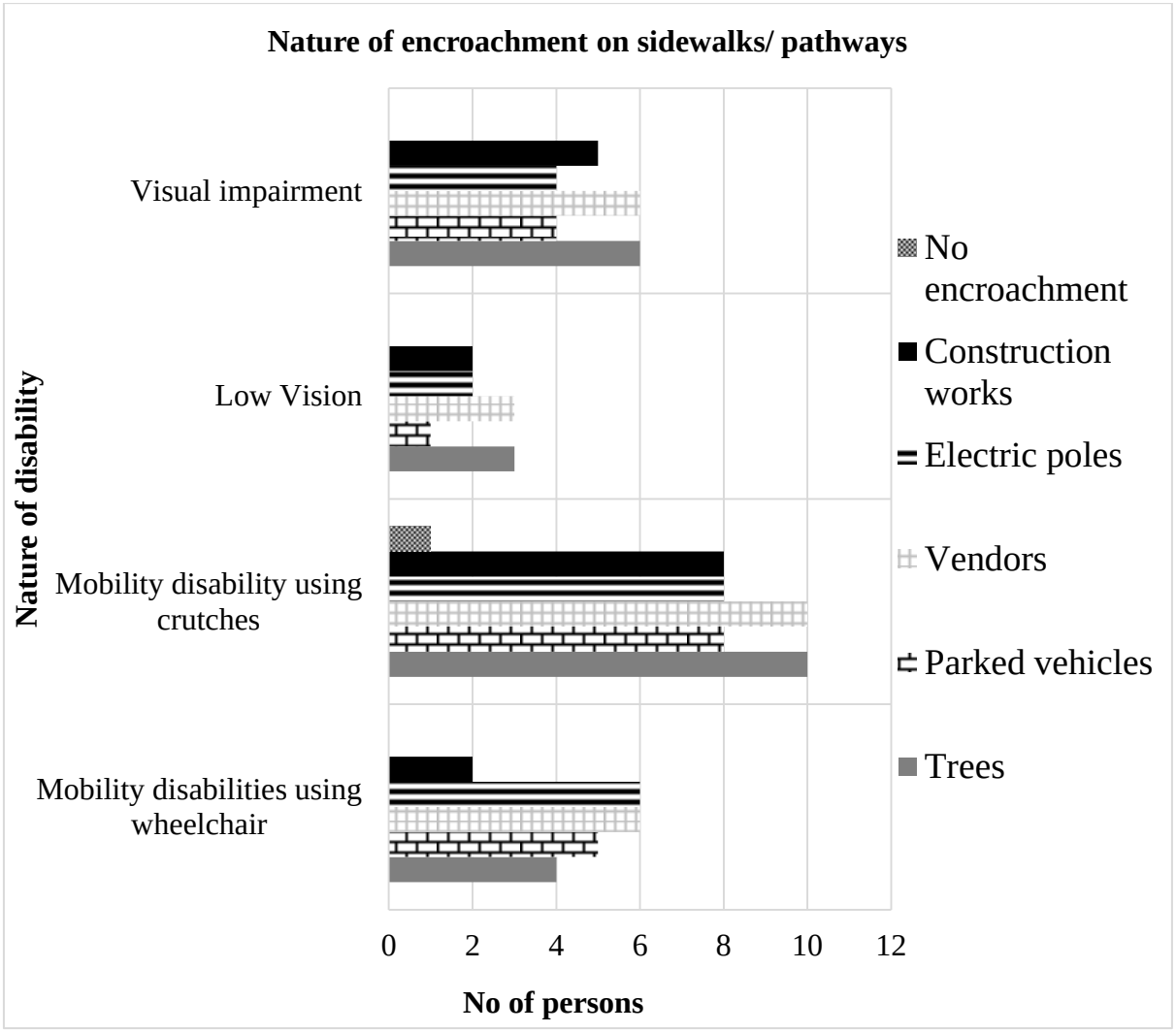


Figure 33. *Nature of encroachment on sidewalks/ pathways*

The chart in Figure 34 shows that most of the PWDs found sidewalks had tactile markings; but they also, however, did not forget to mention that such markings were neither properly planned and maintained nor notified them of impending obstructions. The fact that a significant portion of the PWDs have 'rarely' or 'never' found tactile markings in the area of study means that they are either not continuous in the area or are not continuously maintained and get destroyed or uprooted over time or both. Either way, PWDs cannot completely trust the tactile markings in the study area.

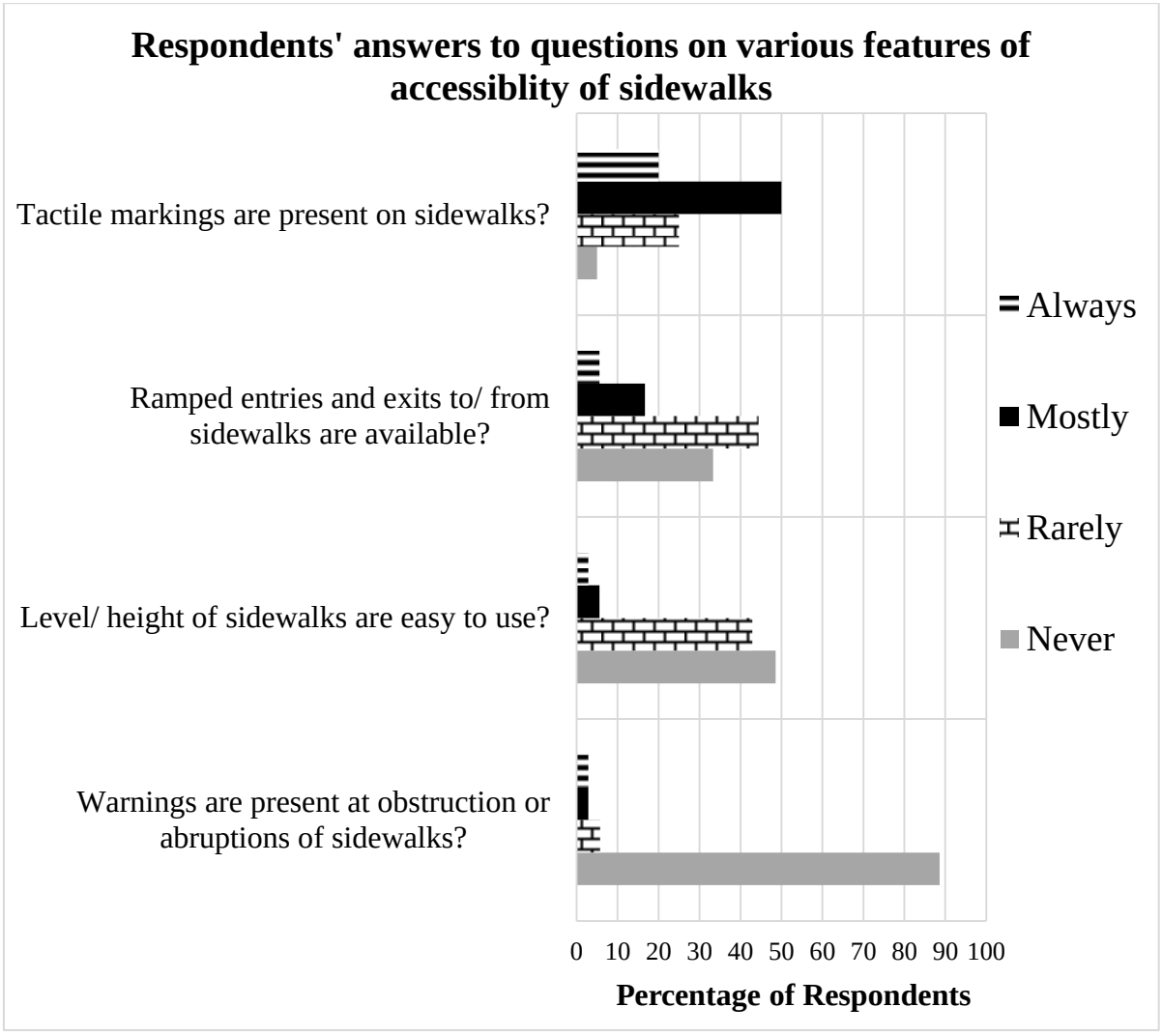


Figure 34. *Respondents' answer to the question on availability of various features of accessibility to sidewalks on the area of study*

Also, according to the chart in Figure 34, the majority of the PWDs found that sidewalks 'rarely' had ramped entries and exits (at 44.4%) and quite many (33.3%) said they 'never' had found ramped entries and exits. This shows that using sidewalks for PWDs is not easy for their mobility and that they face a major stumble to accessibility.

The chart in Figure 34 also shows that the majority of PWDs found that the level or height of sidewalks were 'never' or 'rarely' conducive to their mobility (with 48.6% and 42.9% respectively; they make up the 91.5% of respondents). This shows that the sidewalks are not only failing to meet the standards of accessibility but they might in fact, be also source of hindrance and hardship to move around for the PWDs.

As also seen on the chart in Figure 34, close to 90% of the PWDs responded that there were no provision of warning signs at obstructions or abruptions of sidewalks. Such a situation

can naturally be extremely hazardous to the PWDs, especially those with low vision and the visually impaired.

Upon asking the wheelchair users whether the widths of sidewalks were sufficient for their mobility, the majority of them, at 75%, responded as being 'sufficient' while only 12.5% responded as sidewalks being too narrow (Figure 35). This shows that in the study area, the sidewalks are mostly of usable width to the concerned PWDs.

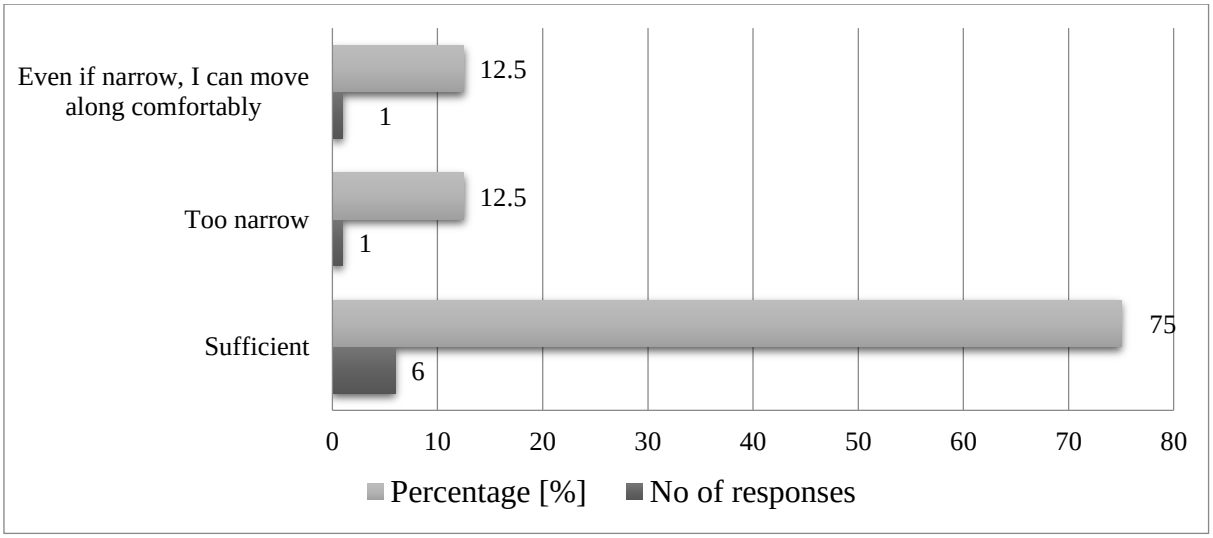


Figure 35. *Responses of PWDs on the width of sidewalks*

5.4.2 Pedestrian crossings

Along the stretch area, there are eight pedestrian crossings including byroads, subways and foot over-bridges. The road crossings are not properly indicated with zebra crossings. The level difference between roads and sidewalks is too high for wheelchair users. In the intersections of the roads, there are no proper signage and indication of zebra crossings. Pedestrians seemed to be crossing the roads haphazardly, as seen in pictures presented in Figure 36.

Figure 36. *Existing conditions of pedestrian crossings*

Table 5 compares the existing condition of the pedestrian crossings in the chosen site against some of the parameters of accessibility.

Table 5. Comparison between existing condition of pedestrian crossings and parameters of accessibility

Parameters	Existing condition of pedestrian crossings
Non-slippery surface finish	Pavements are non- slippery
Cross width gradient > 2%	Most of the places are flat but, in some places, gradient is more than 2%
Use of tactile tiles	No provision of tactile tiles, even zebra crossings are not properly indicated
Use of warning pavement material	No provision of warning pavement material in pedestrian crossings
Level difference between road and sidewalk >20 mm	Level difference is too high in crossings (about 300 mm)
Ramped sidewalk on crossing with 1:12 gradient	No provision of ramps in crossings
Audible traffic signal	No provision of audible traffic signals

More than 90% of the PWDs surveyed felt unsafe on the pedestrian crossings (chart in Figure 37). The PWDs often require more time than other to cross the roads and they are greatly risking their safety while crossing the roads as the roads are missing visible indications of zebra cross markings or the zebra crosses entirely. Lack of proper signage, traffic lights and auditory cues increase to the hazard of crossing the roads and might cause accidents.

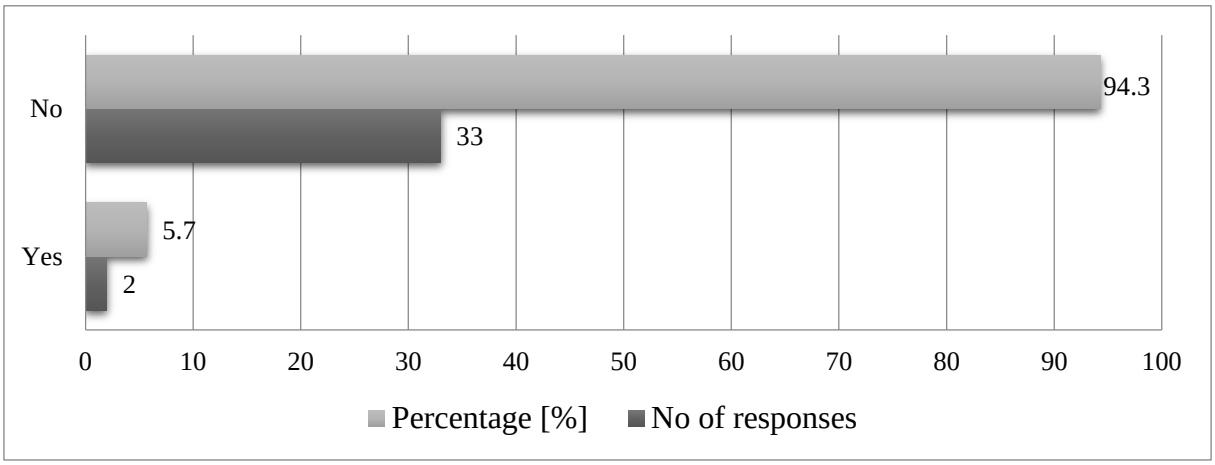


Figure 37. *Responses of PWDs on availability of designated pedestrian crossings*

5.4.3 Bus stops

A bus stop is the first point of contact between passengers and bus services. There are three bus stops in the study area, with nine bus waiting shades- seven in Sundhara, one each in Ratnapark and opposite to Ratnapark. The bus stop at Sundhara serves bus routes to and from Gongabu, Balaju, and Goldhunga. The bus stop at Ratnapark serves bus routes to and from Sanagaun, Imadol and Swoyambhu and the bus stop opposite to Ratnapark serve bus routes from Narayantar, Budhanilakantha, and Lazimpat. Both visually impaired people and wheelchair users could be using these bus stops but the absence of kerb ramps at these stops make it extremely inaccessible and unfriendly for wheelchair users.

Figure 38. *Existing conditions of bus stops in the study area*

A comparison between the existing conditions of these bus stops and some of the parameters of accessibility is provided in Table 6.

Table 6. Comparison between existing conditions of bus stops and parameters of accessibility

Parameters	Existing condition of bus stops
Firmed surface level	Broken pavements, uneven pavement surface
2mx2m for wheelchair lift (if any)	No provision of wheelchair lift
Raised Kerb height > 140-160 mm	Kerb height > 300 mm
Preferred total width > 3000 mm and not less than 2400 mm with waiting area and unobstructed pathway	Width of bus stops is sufficient but is obstructed by bus stop itself in some places
Tactile marking	Provision of tactile marking
Signage/auditory cues	No provision of signage and auditory cues
Information about bus routes	No provision of information of bus routes
Warning blocks on obstruction	No provision of warning blocks on obstruction
Connected to sidewalk	Bus stops are connected to sidewalks

The majority of PWDs (i.e. 88.6%) felt that the bus stops were not accessible to them i.e. because they lacked the provision of information of routes, auditory cues, appropriate kerb heights, etc. Only to 11.4% of the PWDs, the bus stops were accessible (Figure 39). This divide in experience also points to the fact that whatever infrastructures like bus stops are present, they are either not present in the same manner at every location or that they do not meet the needs of accessibility of all kinds of PWDs.

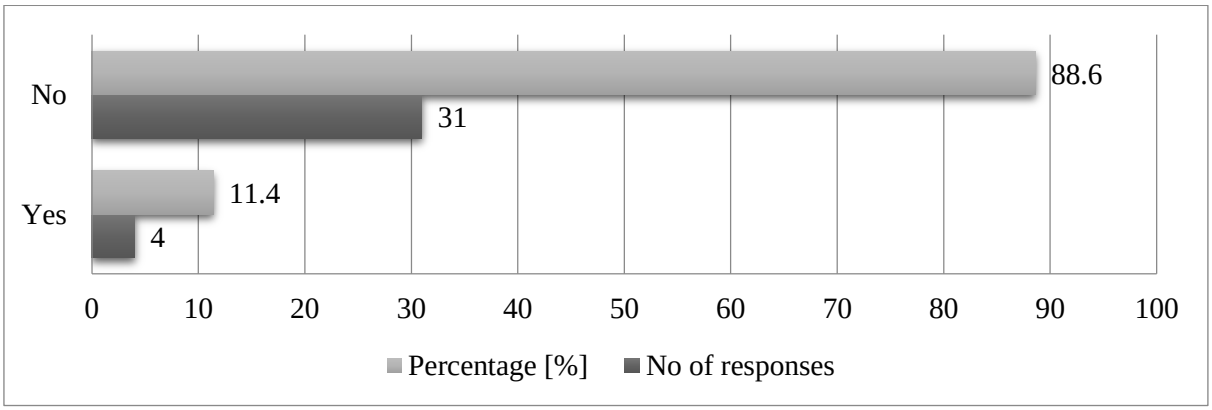


Figure 39. *Responses on whether the PWDs felt the bus stops were accessible*

5.4.4 Subways or foot over-bridges

In the site area, there are three pedestrian bridges and one subway. None of them are accessible to PWDs. Foot over- bridges seem to be in extremely poor condition, long overdue of maintenance and thus difficult to use even for the able people. None of them have ramps and have big riser heights and slippery treads.

Foot over-bridges and subways are provided without considering the need of people with reduced mobility such as wheelchair users and visually impaired. Vendors have created obstruction to the free flow of pedestrians at foot over-bridges and subways.

Figure 40. *Existing condition of foot over bridges and subways in the area of study*

Table 7 compares the existing condition of foot over-bridges and subways against some of the parameters of accessibility.

Table 7. Comparison of existing conditions of foot over-bridges and subways against parameters of accessibility

Parameters	Existing condition of subways and foot over-bridges
Provision of ramps	No provision of ramps in foot over- bridges and subways, riser height of both foot over- bridges and subways is too high that it is difficult to use even by able person, use of these crossings are not safe, treads are slippery, may cause injury to persons with visual impairment
Slope of ramp 5% with appropriate landing	No provision of ramps
Tactile markings	No provision of tactile markings
Well- lit subways	Provision of lighting on subway but obstructed by shops

The majority of the PWDs, i.e. more than 85% of them as seen in chart in Figure 41, found that the foot over bridges and subways were not accessible and that they did not feel safe while navigating. This hints at the poor physical condition of foot over bridges and sub ways which are giving hardship to the PWDs.

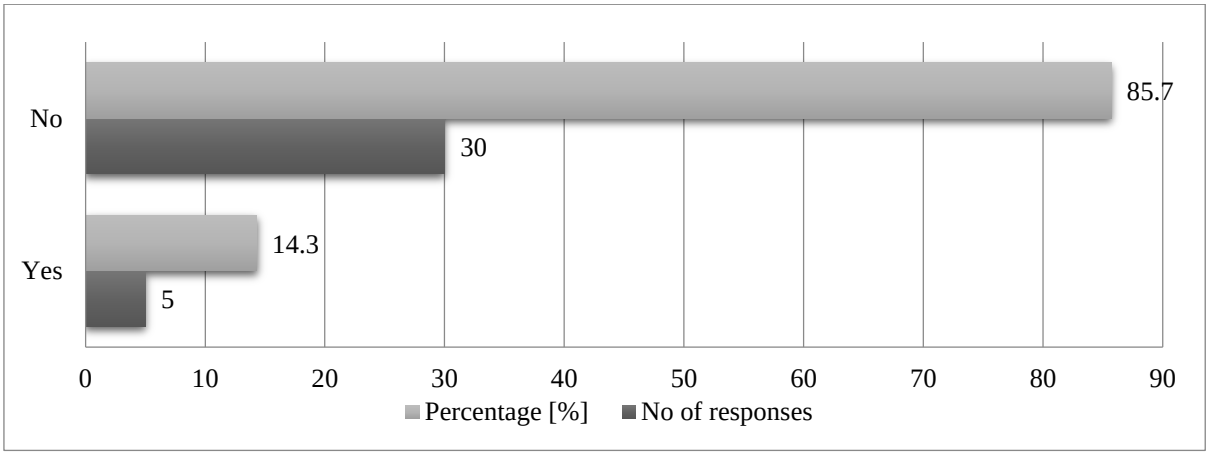


Figure 41. *Responses of PWDs on whether foot over bridges and subways were accessible to them*

5.4.5 Public building entrances

Within the area of study, there are different public buildings such as Dharahara (under construction), Kathmandu Mall (commercial building), Nepal Airlines Corporation (government building), Nepal Army Hospital (hospital building), Trauma Centre (hospital building) and Bir Hospital (hospital building). The linkage between roads, sidewalks, bus stops and these buildings are not properly accessible for PWDs.

The area between Sundhara and Ratnapark plays a major role in linking the transportation services to public spaces of commercial, social and historical importance such as such as the Kathmandu Durbar Square, nearby Bir Hospital and Trauma Center and the Bhugol Park and Ratnapark. Since Bir Hospital is one of the most popular and important hospitals in Nepal, it serves a large number of patients and people from all over the country, including many PWDs, both temporary and permanent. So, accessibility is of utmost importance around the hospital area. Even though the entrance of hospital is accessible to PWDs, adjacent sidewalks are not easily accessible for wheelchair users.

Figure 42. *Existing condition of building entrances at Bir hospital, National Trauma Center and Mahankal Temple*

Figure 43. *Existing condition of building entrances at Nepal Army Hospital, Nepal Airlines Corporation and Kathmandu Mall*

Table 8 presents the situation of the existing condition of public building entrances in the area of study when measured against some of the factors of accessibility.

Table 8. Comparison of the existing condition of public building entrances and parameters of accessibility

Parameters	Existing condition of public building entrances
Access ramps 1:20 to 1:12	NAC building and hospital building has access ramps in the main entrance, but ramp is slightly more than 1:12 No provision of accessible ramps on commercial buildings
Connection to sidewalks	Pavements of sidewalks are broken in various places, sidewalks connected to public buildings are not fully accessible

5.4.6 Open spaces/ parks

Ratna Park is situated at the heart of Kathmandu which is accessible from almost all places around the city by public transportation. The sidewalks between bus stops and this park are not accessible for wheelchair users. There are crossings without Kerb ramps and broken pavements with obstructions like trees, electric poles, and vendors etc. Although the park seems to be somewhat designed by considering the needs of PWDs, it fails to meet the purpose as the main entrance of the park is not accessible to people with wheelchair and also width of entrance gate is not sufficient for wheelchair movement. Table 9 explains the existing condition of the park in terms of its fulfillment of some of the parameters of accessibility.

Figure 44. *Inaccessible entrance at Ratna Park*

Table 9. Comparison of the existing condition of Ratna Park and parameters of accessibility

Parameter	Existing condition of the park
Accessible from sidewalks, bus stops	Partially accessible
Access ramp 1:20 to 1:12	No provision of ramp at the entrance gate
Connection to sidewalks	Level difference between sidewalks and park is 300 mm
Appropriate width of entrance door	Width of entrance gate is not sufficient for wheelchair users

5.4.7 Bus park

The study area includes the Old Bus Park which connects the area with many other places of Kathmandu city. It caters to the transportation from nearby areas as well as places as far as Dhulikhel, Banepa, Bhaktapur, Lalitpur and Thankot. Due to the presence of this bus park which provides relatively easy public transportation facilities and connection routes to many parts of the city and beyond, the volume flow of people in the study area is considerable, including the PWDs.

Figure 45. *Old Bus Park*

Accessibility to the bus park and from it to other parts of the area is however poor because the buses are haphazardly parked and do not have any designated stops or waiting platforms for the pedestrians, let alone PWDs. The visual signage and information about the routes are

not clear to the people and auditory signals are clearly missing. The surface of the bus park is broken and uneven which makes it inaccessible to wheelchair users.

5.4.8 Public toilets

Public toilets are also considered as public space. They should be accessible for people with all kinds of abilities, with proper provision of spaces like entrances with ramps and sufficient width of entrance doors for movement of wheelchair. Within the area of study, there are provisions of three toilets- one outside Ratna Park and two under separate foot over- bridges. The public toilet outside Ratna Park is somehow provided with ramps for wheelchair users but they are hardly usable as they do not meet the required standard (Figure 46). Toilets under the foot over- bridges are too congested and do not have enough width of 600 mm at entrances.

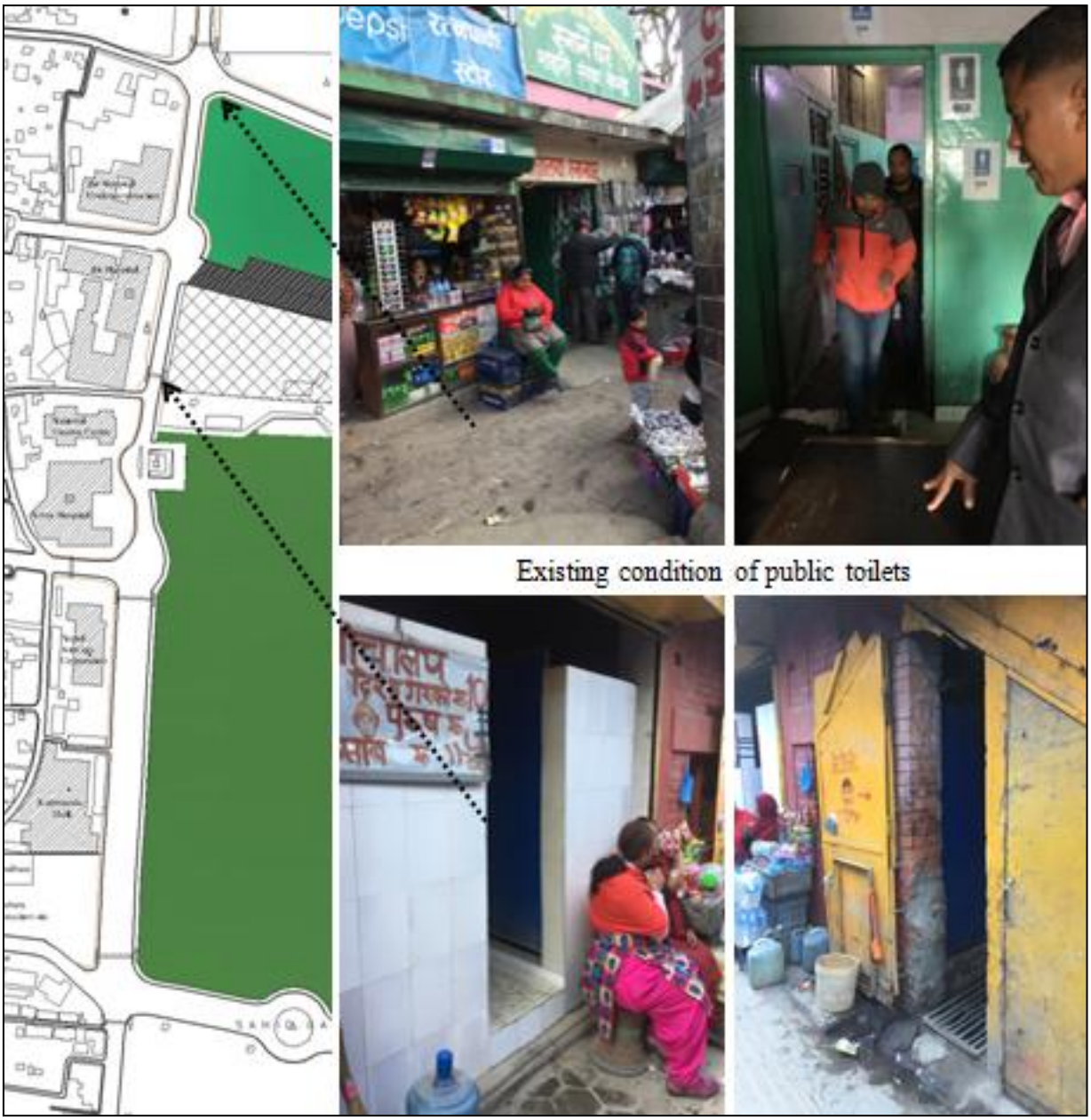


Figure 46. *Existing condition of public toilets in the area of study*

The existing conditions of public toilets in the area of study are compared against some of the parameters of accessibility on Table 10.

Table 10. Comparison between existing condition of public toilets and parameters of accessibility

Parameters	Existing condition
Accessible from sidewalks	Public toilet near to Ratna Park is partially accessible but toilets under pedestrian bridge are not accessible, level difference between sidewalk and toilet is 250 mm
Width entrance door > 900 mm	Door widths are less than 900 mm

5.5 Analysis based on observation

Each zone of the study area was observed to find out which segment was the one mostly used by PWDs within the study area. The segment along Bir Hospital, National Trauma Centre, and Nepal Airlines Corporation was the one most frequently used by PWDs. This was probably due to the presence of one of the largest hospitals of the country. The sidewalk along the hospital building in this zone also links the Kathmandu valley to the major commercial area comprising New Road, Ason, Indrachowk and Kathmandu Durbar Square. The facilities such as bus stops and public buildings were also lined up in this portion, so this stretch is most frequently used by the PWDs. Based on the researcher's own detailed and timely observation, it was found that the zones along Tundikhel were not as frequently used by the PWDs. The sidewalks on those segments were also relatively continuous, wide enough to use, with intact pavements and had tactile makings without obstruction. This might be due to the relatively less wear and tear resulting from less frequent use by pedestrians because of an absence of services and facilities like bus stops, public buildings, and commercial area, etc on that side. The major findings from the observation can be outlined as below:

- The frequency of use of public spaces depends on the services and facilities provided in the area
- The land use (commercial, institutional, open spaces, etc.) and transportation infrastructures (bus stops, bus parks, etc.) play a major role in the vibrant use of public spaces
- The physical condition of infrastructures deteriorate when they are frequently used

- The public spaces, their infrastructures and elements of accessibility need to be maintained regularly and systematically over time to keep them safe to be used by PWDs

When the site conditions of the public spaces in the area of study are compared with the standards of accessibility determined in the literature review, they do not meet the criteria required to be considered providing accessibility. This shows that the physical infrastructures are not designed and planned to meet the issues and requirements of PWDs, and a long term vision and continuity in infrastructure development is lacking. For example, sidewalks are narrowed by pedestrian bridges when they are later constructed in the place of or right next to the sidewalks. The major findings from the comparison between the existing conditions of the publics spaces in the study area and the criteria of accessibility found in literature are:

- None of the public spaces in the study area are designed, planned, constructed and maintained according to the principles of universal design and accessibility
- PWDs do not feel safe and accessible while using those public spaces

5.6 Analysis based on questionnaire survey

The quantitative data obtained from questionnaire survey on the issues, problems and challenges faced by PWDs regarding their accessibility to public spaces are discussed in the following sections.

5.6.1 Problems faced by PWDs

As shown in the chart in Figure 47, for the majority of the PWDs, the most common problems in using the public spaces accessibly were that they were overcrowded and had broken pavements. Similarly, poor conditions of roads and pathways (for example, pathways being discontinuous and intermittent) are also significant problems faced by all types of PWDs. The fact that many PWDs also point out to the absence of adequate or designated pedestrian crossings show that not even the most basic aspects of accessibility are fulfilled in the public spaces of Kathmandu valley. Designating and maintaining pedestrian crossings should, in theory, have been one of the most economical solutions to providing accessibility. However, the absence of them shows that the problem is not economical but that of recognition, policy, implementation and willpower.

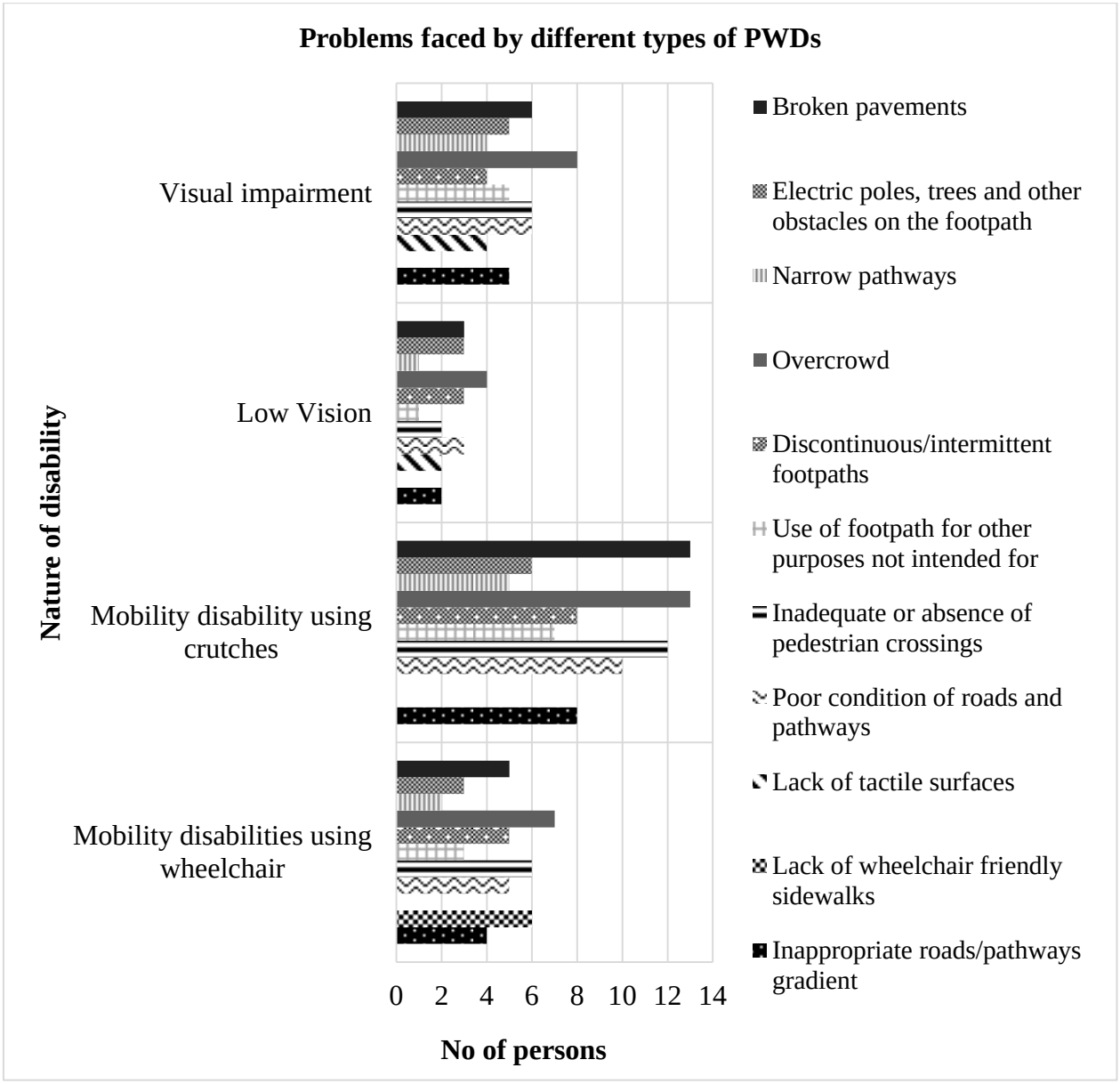


Figure 47. *Various problems faced by PWDs according to their nature of disability*

The problems cited by the PWDs also show that the public spaces like sidewalks are not designed as per the frequency and purpose of uses and volume of the people. The major reason for poor existing conditions of physical infrastructures is the lack of monitoring during their construction and an absence of continuity to policies and adherence to the guidelines. The graph shows that at least in the study area, the PWDs did not have the problem of sidewalks being narrow.

5.6.2 Challenges faced by PWDs

For most of the PWDs, the major challenge in using the public spaces was the issue of a lack of safe pedestrian infrastructures (Figure 48). Almost an equal number of them could also

clearly see that the lack of co-ordination between government bodies was responsible for creating challenges to their accessibility to public spaces. The PWDs could also clearly feel that the policies enabling accessibility were poorly implemented in practice. Except wheelchair users, other types of PWDs are also equally concerned about the cost they have had to bear to get the same levels of accessibility, whatever they are, as the rest of the general population. The responses given by the PWDs regarding the challenges faced by them in terms of accessibility to the public spaces show that there is not 'one particular' problem or challenge but a multiple of them with various facets to them. The problems and challenges relate to both the physical infrastructures and facilities as well as to the policies, acts and guidelines and their implementation.

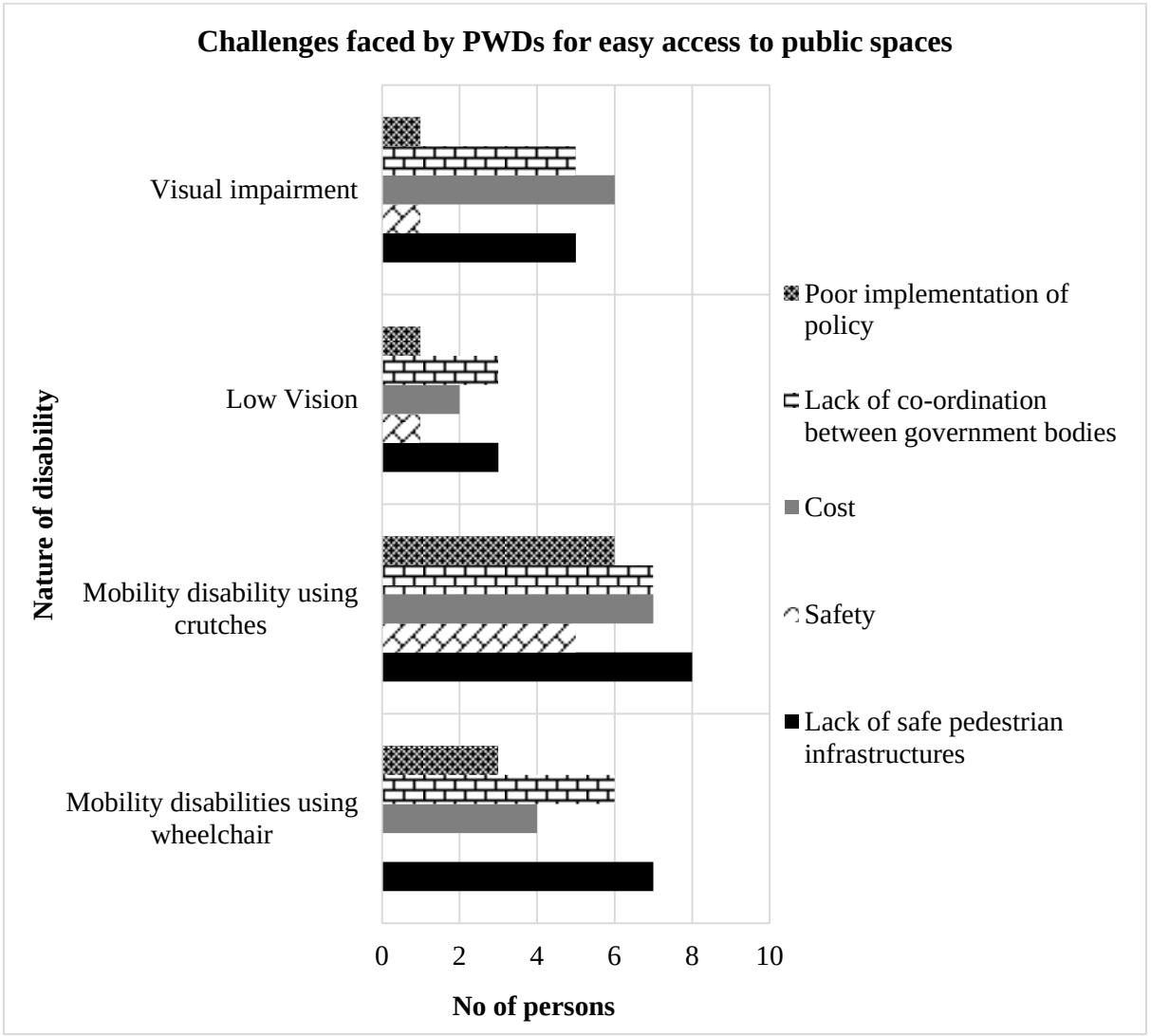


Figure 48. *Various challenges faced by PWDs according to their nature of challenges*

5.7 Analysis based on key informant interviews

Laxmi Gurung, a vendor with low vision

Laxmi Gurung is a vendor with low vision from Balaju. She sells cosmetic products on sidewalk near Nepal Airlines Corporation. Originally, she comes from a small village in Sindhupalchwok. She could not get any education due to her vision disability because the school in her village was not able to provide infrastructure required for her needs. She got married at the age of 20 with another visually impaired person. She claims that her husband later left her and married to a girl with vision. According to her, the husband left her because of her disability. Now, she lives alone and comes daily to the place for vending from which she can earn money for living. She is also a member of an organization of the Blinds and advocates women's rights.

Her experience of using the built environment is not good. When she used to ask about directions to places, people were reluctant to respond to her and sometimes even gave wrong directions. The bus/ micro bus staffs were not helpful in giving information about places or routes. She felt that the able people's attitude towards PWDs was not supportive in the past but is slowly changing, and people are more helping towards PWDs when they are in trouble. To her the experience of using mobility and accessibility infrastructure were not comforting and did not meet her needs. Twice while using sidewalks, she got injured due to broken pavements and obstruction; in both cases the tactile markings were not properly laid out and did not warn her of impending hazards. Pedestrian crossings were not easy to use for her as they are not indicated by auditory signals. Pedestrian bridges were not easy to use either. According to her, to the people with low vision, the materials used in sidewalks should be of bright colors so that they are easily identifiable and navigable. She further added that there should be strong acts and policies which can enforce as well as monitor the construction and provision of public spaces that are accessible to all including the PWDs.

Mr. Bimal Paudel, accessibility expert in National Federation of the Disabled- Nepal

Mr. Bimal Paudel, who is an accessibility expert in the National Federation of the Disabled-Nepal, was interviewed about the issues, problems and challenges of accessibility faced by persons with disability in using public spaces in Kathmandu. He was also the team member of accessibility audit in Kathmandu (see Section 2.6.5 for information about the audit) and viewed that none of the public spaces, infrastructures and services in Kathmandu is fully accessible for the PWDs. He thought that there are various barriers such as structural (built

environment), social or attitudinal, policy-based or institutional that are faced by PWDs in their daily life. Although there are some interventions seen in the built environment, they are not sufficient and do not cater to the PWD's demand for easy access to public spaces. He opined that any of the public space infrastructure in the city does not meet even the minimum standards of accessibility. He pointed out that even though the tactile markings are provided, they are not continuous and are indeed misguiding in such a way that they lead to obstructions and hazards. The linkage between services and public spaces are not defined. The reason for improper planning and inadequacy of accessibility in present infrastructures, he cited, is a lack of proper implementation, management and coordination between the authorities who are responsible for the enforcement of policies and standards. He further added that it does not cost fortune to make PWDs friendly infrastructures; it may cost merely 5-10% higher than the present total cost. He also said that there are no mandatory rules for the implementation of acts and policies safeguarding the rights of accessibility to all even though Nepal has them strong on paper. He added that although the PWDs are involved in policy making and decision making levels, their involvement, expertise and opinions are not considered in the implementation and monitoring phases. He concluded that promoting accessibility or removing the barriers faced by PWDs in built environment may actually reduce the financial burden of government and families of PWDs.

Ar. Milan Bagale, accessibility expert in NFDN

As an accessibility expert in NFDN, Mr. Bagale is involved in making checklist to audit the accessibility in Kathmandu and also in making guidelines to make city infrastructures accessible. He has also been involved in accessibility planning in public spaces like the Aviation Museum, Guheshwori Secondary School, a park in Dolakha and Bajrabarahi picnic spot. He found that the accessibility for PWDs to the public spaces was taken care of only sporadically because of budget constraints and a lack of awareness and information about at what scale accessibility has to be actually guaranteed. In Nepal, works related to PWDs come under the jurisdiction of Ministry of the Women, Children and Social Welfare (MOWCSW) but Mr. Bagale felt that the matter of accessibility to public spaces for PWDs should be under the jurisdiction of Ministry of Urban Development as well, so that the issues of accessibility can be rightly incorporated in urban planning. He said that the driving principle should be that of 'universal design' instead of just 'disabled friendly design' so that the public spaces can be used by person of all kinds of abilities. He added that even though there are various policies advocating accessibility to public spaces for PWDs, they lack the

comprehensive norms and standards to actually put them into practice in making accessible physical infrastructures. He emphasized that a good starting point would be to have some model works showing the details and features of accessible infrastructures. In his experience, even though there are indications about the features of accessible infrastructures in the National Building Code, it lacks the details for accessibility and also comes short in explaining the features of accessibility of the exterior parts of building. According to him, in Nepal most people are not aware of the features and necessity of accessibility and think that merely providing the ramps to building entrances will make the physical infrastructure accessible. To him, poor accessibility to public spaces for the PWDs is a result of the knowledge and skill gap between experts and authorities of implementation. He also concluded that the movement for inclusive development only began after the 2062/63 people's movement and prior to that disability was often perceived as a shame for the family and society and that there was not an effort to make development inclusive.

Rabindra Rai, engineer at Kathmandu Metropolitan City

Mr. Rai was asked about the works carried out to make accessible infrastructures and services for PWDs in KMC and challenges faced by the metropolitan city in implementing the policies related to accessibility. According to him, KMC has been addressing the issues related to PWDs in providing accessible services and infrastructures for only two years now. He informed that the responsibilities of providing and maintaining different services and infrastructures in the city are given to various authorities of the government depending on size and sector. He said, that for example, roads with width less than 8 m fell under the authority of the municipality but those with more than 8 m felt under the authority of the Department of Roads. That would mean that the sidewalks and other physical infrastructures of the study area were not under the authority and maintenance of the municipality. He said that the responsibility of construction and maintenance of sidewalks along 8 m or less wide roads and installation of sewerage falls under the responsibility of KMC, but due to budget constraints, they could not be able to maintain periodically. From his information, it can be clearly seen that the lack of coordination between the authorities of the government is one of the major reasons for poor and unplanned construction and maintenance of physical infrastructures like sidewalks, bus stops, pedestrian crossings, foot over bridges/ subways, etc. Mr. Rai also noted that the physical infrastructures are so poor that they are difficult to use not only for the PWDs but also for the able people. When asking him about the reason behind the physical infrastructures not being able to meet minimum standards of usability by

people with all kinds of abilities, he answered that it was due to the lack of awareness in implementation of the physical plan and an attitude of negligence towards the PWDs. He agreed with Mr. Paudel from NDFN that the cost to make infrastructures PWDs friendly would not be higher than 5-10% of the total cost of the projects. He opined that the major problem in making infrastructures accessible was a lack of monitoring in the enforcement of policies rather than the absence of policies themselves. He also added that the concept of inclusive and universal design was new to KMC, as well as in Nepal and thus it may take quite some time to incorporate features of accessibility in present physical infrastructures.

Anjan Raj Shrestha, architect at Design Cell

Mr. Shrestha was involved in the design of Accessible Road Design for People with Disabilities under Kathmandu Sustainable Urban Mobility Forum III (discussion about this design is in Section 2.8.1). He said that while designing the PWDs friendly physical infrastructures, a planner or designer should be aware of the requirements of PWDs so that they can use it easily. He also reiterated the lack of co-ordination between the concerned authorities. As an example of this, he pointed out that the accessible 100 m section of road from Khagendra Navajeevan Kendra towards Jorpati, which was designed by his firm with the approval of the Government of Nepal and Department of Roads, was later demolished by the Department of Roads itself in the name of road expansion. He concluded that it not only shows the lack of long term vision in physical infrastructure development but also the apathy from concerned authorities towards the right of accessibility of the PWDs.

5.8 Issues identified from survey and interviews

Findings from the survey and interviews point to the existence of serious problems with respect to accessibility of PWDs to the public spaces such as sidewalks, bus stops, pedestrian crossings, foot over bridge/sub ways, etc in the city of Kathmandu. These problems prevent them from equal participation to social life by creating barriers that impede their pedestrian movement, usage of means of transportation, and access to services and commerce. Major factors that have led to barriers to physical infrastructures can be summarized as follows:

- Poor existing conditions of public spaces and physical infrastructures which do not meet the minimum standards of accessibility for PWDs
- Whatever of the few interventions intended to make public spaces accessible, are made without proper planning and neglecting the requirements of PWDs,

and hence are sporadic, not continuous and even lead to obstructions and hazards

- Poor maintenance of public spaces and infrastructures which have resulted in them being unsafe and sources of physical injuries to the pedestrians, especially the PWDs
- Lack of coordination between the government and development authorities such as the municipality, Department of Roads, Nepal Electricity Authority, KUKL, etc. as they blame each other for the causes of unplanned and haphazard construction of physical infrastructures in the city
- Lack of awareness among the government authorities regarding the importance of co-ordination between them
- Policies lacking comprehensive and holistic approach to accessibility in public spaces as the concept of inclusion is still new to Nepal
- The existence of the statement "PWDs friendly infrastructure" in every policy document merely in words but failing to concretely outline the design standards and guidelines about the ways of making the infrastructures PWDs friendly in action
- Lack of knowledge and attitude of negligence amongst the designers, planners and decision makers about the existence of accessibility and mobility standards and their usability, applicability and universal utilization value
- Lack of bylaws which obligate the concerned professionals to make public spaces and physical infrastructures accessible for all
- Lack of long term vision on the part of government agencies in the development of public spaces and physical infrastructures
- Lack of a dedicated monitoring body of government due to which there is not only the lack of the up-to-date information about the present conditions of accessibility but also a failure to monitor the design and construction of infrastructures and services
- Lack of involvement and consultation with PWDs in planning and design as well as implementation phase in order to mainstream the ideas of mobility and accessibility in the built environment. So far, they have had to satisfy with only token representation in some policy making processes.

6 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The concept of providing equal access and accessibility in built environment focuses on making the necessary changes for PWDs who have more limited opportunities to take advantage of services and facilities than others. This research made an attempt to explore the conditions of accessibility and the problems and challenges faced by PWDs in public spaces of Kathmandu by choosing one of its busiest areas as the site of study. The major barriers to accessibility for the PWDs identified in this research are institutional and structural (built-environment), which mainly show the lack of institutional enforcement and monitoring in physical infrastructure development in Kathmandu.

The pedestrian infrastructures and services in Kathmandu often do not meet the required standards of quality (such as usability, durability etc.), and are not safe and comfortable to be used by people with all kinds of abilities. Infrastructures in those public spaces have been instead, identified as providing continual barriers to the usability of urban space in KMC, especially to the PWDs. The PWDs do not feel safe while using the sidewalks and pedestrian bridges because of physical obstructions such as encroachment, broken pavements, inappropriately located bus stops etc. Such hurdles not only greatly compromise the safety of PWDs but also burden them and possibly their families financially as the cost of maintaining mobility devices like wheelchairs, crutches and walking sticks is not paltry. This research has analyzed and come to the conclusion that the existing physical infrastructures in public spaces such as sidewalks, bus stops, pedestrian crossings, foot over bridges/ subways and entrances of public buildings are not even partially accessible to the PWDs in comparison to the standards of accessibility design presented in literature study and available in the international context (for example, in countries where the rights of PWDs are acknowledged equally as of any others).

Although, few interventions like placement of tactile markings (directional and warning) and provision of ramps in public building entrances are seen to have been made, they are only sporadic, are not easily usable by the PWDs and in turn contribute to the confusion rather than solution. This clearly shows that there is an attitude of negligence on the part of the authorities of implementation and that the usability and safety factor of infrastructures are not at all considered in design and planning processes; a fact, not only seen from the observations made by the researcher but also acknowledged by the PWDs themselves in the

survey and by related experts in the interviews. The problems also seem to arise from the lack of coordination between the various authorities of government who share the responsibility of providing physical infrastructures and services in the city and their intent to find loopholes to do away with the implementation of accessibility standards and designs outlined by the prevalent policies. The policies and building codes themselves, other than stating the need for infrastructures to be accessible to the PWDs, fail to define the actual methods to make public spaces accessible and the ways in which those methods can be followed by architects and planners. The first step to fixing these problems could be to involve the PWDs and experts of accessibility in the implementation phase of infrastructure development and to shift the focus from mere paper planning to accessibility and usability.

There is a significant number of PWDs living in KMC compared to the rest of the country and thus there is an urgent need to look more closely at their needs, problems and challenges from a planning perspective. PWDs should no longer be treated as just a minority group and their problems with mobility, accessibility and usability should be recognized as society's common agenda in the mainstream urban planning and design. Urban planning could and should play a vital role in improving the conditions of accessibility to the built environment by removing existing physical, institutional and social barriers in order to benefit the PWDs just like the rest of the population and to ensure their equal participation in society. Otherwise, inaccessible public spaces and barriers around us will mean the continued struggle for PWDs to guarantee their economic independence and the fulfillment of their human rights.

6.2 Recommendations

After analyzing the existing conditions of accessibility for PWDs to the public spaces in Kathmandu through observation, questionnaire survey (of PWDs) and interviews with key informants, the following recommendations are deemed important to be made to improve the standards of accessibility in the city:

a. Legal framework on implementation and monitoring of physical infrastructure development

In Nepal, there are various policies that are intended to ensure accessibility in public spaces but what is critically lacking is a strong legal base for implementing the policies into action and then monitoring that those are implemented. A strong legal framework can direct and obligate any infrastructure development authority to implement and periodically monitor the

conditions of accessibility as specified in the policies. There are a few initiatives taken by the government to promote inclusive development on the surface but fail to detail out how the requirements of inclusive development are to be met at the grass root level.

Most of the problems of accessibility to public spaces in Kathmandu could be solved if there were better co-ordination between the different authorities of the government. A lack of ownership of the ideas of accessibility from the different government authorities responsible for infrastructure development was a major problem identified in this research. Such a situation must be thus addressed by laws which mandate the undertaking of responsibilities by authorities as well as the necessary coordination between them.

b. Design standards and guidelines incorporated in building code and by-laws

Design standards and guidelines are sets of recommendations intended to ensure a good practice in design of any space. They are intended to provide clear instructions to designers and development authorities on how to adopt specific principles, such as universal design, accessibility, mobility, etc into their designs. However, in Nepal, there are very few guidelines; even the ones stated in the 'Accessible Physical Infrastructure and Communication Services Directive for PWDs (2069)' provided by MOWCS is not able to accommodate all the aspects of accessibility. These guidelines, and if they are not enough, various other international standards of accessibility should be made mandatory in building codes and bylaws to be followed in every approval of urban space and infrastructure development maps.

The design standards and guidelines for accessibility should specifically include the requirements to be fulfilled for public spaces such as sidewalks, bus stops and parks, pedestrian crossings, parking, public buildings (hospital, commercial, etc.), recreational parks, open spaces etc. and provide detailed narratives to the designers so that they can follow them word-by-word.

c. Public-Private Partnership in infrastructure development

The research found that some of the design and development works promoting accessibility were done by private sector in co-ordination with the government but were later not conserved by the government authority (e.g. DOR) itself. The government and its concerned authorities should take ownership of such initiatives taken by the private sector and utilize as good examples. The government should protect and improve the provisions of existing infrastructures, especially when they are developed by private sector in coordination with

itself. Service providers like hospitals, educational institutions and commercial organizations should co-ordinate with the government authorities to provide accessible facilities and services in outdoor spaces that connect people from major road networks and transportation centers to the gates of service providers.

d. Involvement of PWDs in planning, implementation and monitoring level

Although there is involvement of PWDs and activists advocating for the wellbeing of PWDs in planning and policy making level, they rarely seemed to be consulted and given a role in implementation and monitoring phases. The result is poor physical infrastructures which do not meet most of the criteria of accessibility and usability. It should be the PWDs who are given leading role in monitoring whether the public spaces are fully accessible to them or not.

e. Awareness among public for behavioral changes towards PWDs

The research found that a significant section of the general public did not feel responsible towards PWDs; for example, those vending and parking in the sidewalks who did not seem to be aware or care about the barriers created by them for the PWDs. They fail to realize that even small encroachment on public spaces can impact the safety, comfort, mobility and accessibility of a PWD. So, it is necessary to bring awareness raising programs to the public in order to make them realize how their small actions of irresponsibility can cause huge losses to the PWDs.

f. Accessibility guidelines for public spaces

Finally, it is recommended that the concerned authorities should both complete the insufficient guidelines safeguarding the accessibility of PWDs to public spaces as well as update them according to the internationally recognized accessibility practices given in Table 2 of Section 2.9.

g. Recommendation for further studies

This study is limited to the accessibility of public spaces such as sidewalks, pedestrian crossings, bus stops and public building entrances. The research could be further extended to find out issues of accessibility in public transportation, public buildings and their premises and open spaces.

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APPENDIX 1: QUESTIONNAIRE SURVEY

Questionnaire to PWDs about their accessibility to public spaces in Kathmandu

1. **Age**

a. Below 10 yrs b. 10-20 yrs c. 20-30 yrs d. 30-40 yrs e. 40-50 yrs f. 50-60 yrs g. 60+ yrs

2. **Gender**

a. Male b. Female c. Trans

3. **Nature of disability**

a. Mobility disabilities using wheelchair b. Mobility disabilities using crutches

c. Low vision d. Visual impairment

4. **Education**

a. Illiterate b. Literate c. Primary d. Secondary e. Higher secondary

f. University degree

5. **Employment**

a. Student b. Service c. Private firm d. Self-employee

e. Unemployed

6. **What mobility device do you use to move around?**

a. Crutches b. Motorized wheelchair c. Manual wheelchair d. Walking stick

7. **What mode of transport do you use the most?**

a. Public Bus/Microbus b. 2-wheeler c. Wheelchair d. Taxi e. Walking (with stick)

8. **Reason for choosing the above mentioned mode of transport is (multiple choices possible)**
   a. The staff are helpful
   b. Easy to board and alight
   c. Safe
   d. The information regarding the route and stop is clear and concise
   e. Economic
   f. The only available option that is usable enough
   g. All of the above

9. **Do you travel alone?**
   a. I feel like going alone
   b. Only to the familiar places
   c. Never alone as I do not feel comfortable and secure
   d. I rarely go out

e. I cannot go alone due to the nature of disability or barriers

10. Do you travel to places other than your school/workspace?

a. Frequently
b. Not often
c. Rarely
d. I only go out to places related to work
e. I do not go anywhere

11. How often do you visit marketplaces?

a. Daily
b. Every few days
c. Weekly
d. Monthly
e. Yearly

12. How often do you visit public parks/recreational spaces?

a. Every few days
b. Weekly
c. Monthly
d. Yearly
e. Rarely

13. How far is your workspace from your residence?

a. <500 m b. 500m-1000 m c. 1000-1500 m d. Above 1500 m

14. How far are market/hospitals/public buildings from your residence?

a. <500 m b. 500-1000 m c. 1000- 1500 m d. Above 1500 m

15. Do you feel that sidewalks that you use for mobility are encroached?

a. Always b. Mostly c. Rarely d. Never

16. Do sidewalks that you use for mobility have tactile markings?

a. Always b. Mostly c. Rarely d. Never

17. Nature of encroachment on sidewalks you use for mobility (multiple choices possible)

a. Trees b. Parked Vehicles c. Vendors d. Electric poles e. Construction works f. No encroachment

18. Do sidewalks you use for mobility have ramped entries and exits?

a. Always b. Mostly c. Rarely d. Never

19. Are the level/ height of sidewalks you use for mobility easy to use?

a. Always b. Mostly c. Rarely d. Never

20. Are the widths of sidewalk sufficient for wheelchair?

a. Sufficient b. Too narrow c. Even if narrow, I can move along comfortably

21. **Are there any warning signs whenever there is some obstruction or when the sidewalks end?**
    a. Yes
    b. No
22. **Do you feel safe on pedestrian crossing?**
    a. Yes b. No
23. **Are bus stops accessible from public spaces (hospitals/government building/commercial building/parks)?**
    a. Yes b. No
24. **Have you encountered subways and foot over bridges with ramped entries and exits?**
    a. Yes
    b. None
    c. Very few
25. **Do you think the current signage for directions and information regarding places are helpful?**
    a. A lot b. Not much c. Not helpful at all
26. **Do you think people without disability are helpful to you if asked about routes, directions or other travel related information?**
    a. Always b. Mostly c. Rarely d. Never e. I feel hesitant to ask for information
27. **What problems do you face in reaching public spaces such as parks, market areas, places of public services, hospitals, schools, places of worship and heritage? (multiple choices possible)**
    a. Inappropriate roads/pathways gradient
    b. Lack of wheelchair friendly sidewalks
    c. Lack of tactile surfaces
    d. Poor condition of roads and pathways
    e. Inadequate or absence of pedestrian crossings
    f. Use of footpath for other purposes not intended for
    g. Discontinuous/intermittent footpaths
    h. Over-crowd
    i. Narrow pathways
    j. Electric poles, trees and other obstacles on the footpath
    k. Lack of norms and standards for accessibility
    l. Other……

28. What are other challenges faced by PWDs for easy access to public spaces? (multiple choice)

a. Lack of safe pedestrian infrastructures
b. Safety
c. Cost
d. Poor implementation of policy
e. Others.....

29. Your overall experience while navigating in the environment is seamless?

a. Yes
b. No

APPENDIX 2: DATA SHEET ON SITE OBSERVATION

Table 11. Data sheet presented in a table format showing for each zone of the area of study the time of day the observations were made, the number of PWDs found using the public spaces, how those spaces were used by PWDs, what nature of disability they had and the questions they were asked.

Zone	Time	Use of area	Observation	Nature of disability	No. of people	Questions
1. Stretch along Sundhara to Kathmandu Mall	Morning (9:00-10:00) Afternoon (12:00-1:00) Evening (5:00-6:00)	– Foot over bridge – Pedestrian way – Bus stops – Commercial area (vendors using the sidewalks)	– Broken pavements and uneven surfaces – Obstruction by construction of Dharahara and improper design of bus stops – Obstruction by cover of man hole – Users of the area: children, adults, women, old people, persons with disability	– Crutch user – Visually impaired – Wheelchair user	4	What kind of obstructions do you face in the sidewalks?
2. Stretch along Nepal Airlines Corporation and New Road Gate	Morning (9:00-10:00) Afternoon (12:00-1:00) Evening (5:00-6:00)	– Pedestrian way – Bus stops – Commercial areas – Sidewalks used by vendors and hawkers	– Broken pavements and uneven surfaces – Obstruction by construction of Dharahara and improper design and placement of bus stops – Obstruction by a man hole cover of drainage – No Kerb ramps – Tactile pavings are not continuous	– Crutch user – Wheelchair user – Low vision – Visually impaired	6	Have you ever bumped into the obstructions?

			and no provision of warning tiles in level difference – Users of the area: children, adults, women, old people, persons with disability			
3. Stretch along Army Hospital and National Trauma Centre	Morning (9:00-10:00) Afternoon (12:00-1:00) Evening (5:00-6:00)	– Pedestrian way – Building entrance	– Kerb height is too high (i.e. 300mm) – Ramp on the entrance of National Trauma Centre is steep and the surface is not even – Cross ramp of the sidewalk is more than 2% – Width of sidewalk is narrowed by the tree and electric poles – Broken pavements – No continuous tactile markings – Users of the area: children, adults, women, old people, persons with disability	– Crutch user – Wheelchair user – Visually impaired	6	Can you move freely from bus stop to the hospitals?
4. Stretch along Bir Hospital	Morning (9:00-10:00) Afternoon (12:00-1:00) Evening (5:00-6:00)	– Pedestrian way – Sidewalks used by vendors and hawkers	– Broken pavements – Sidewalks narrowed by foot over bridge – Width of sidewalks is not uniform – The condition of foot over bridge is very poor and slippery – Tactile markings are ended on	– Wheelchair user – Crutch user – Visually impaired – Low vision	12	

			obstructions – Sidewalks are obstructed by parking – Sidewalk along main entrance gate of the Bir Hospital have uneven surface, a wheelchair cannot move freely – Unmanaged and haphazard pedestrian crossing – No clear mark of zebra crossings – No auditory signage, signage, traffic lights, warning blocks in obstructions or in change of level – Users of the area: children, adults, women, old people, persons with disability			Can you move freely from bus stop to the commercial building/spaces? Is it easy to use foot over bridge and subways?
5. Stretch along extended part of Bir Hospital to Bhotahiti	Morning (9:00-10:00) Afternoon (12:00-1:00) Evening (5:00-6:00)	– Pedestrian way – Sidewalks used by vendors and hawkers – Bus stops	– Broken pavements – Width of sidewalk is not uniform – Tactile markings are not continuous – Sidewalk obstructed by construction materials – Users of the area: children, adults, women, old people, persons with disability – Sub way is not accessible for wheelchair user	– Wheelchair user – Crutch user – Visually impaired – Low vision	4	Are people helpful

6. Along Ratnapark	Morning (9:00-10:00) Afternoon (12:00-1:00) Evening (5:00-6:00)	– Pedestrian way – Sidewalks used by vendors and hawkers – Bus stops – Park area	– Wide enough sidewalks – Some portion of pavements are broken – Continuous tactile markings but no use of warning blocks in obstructions – Absence of Kerb ramps in crossing – Height of Kerb ramp is too high (i.e. 300mm) – Clear marking of zebra crossing – Entrance of Ratnapark is not accessible to wheelchair users	– Wheelchair user – Visually impaired	2	when you are in trouble due to the built environment? Are sidewalks easy to navigate?
7. Along Bus park	Morning (9:00-10:00) Afternoon (12:00-1:00) Evening (5:00-6:00)	– Pedestrian way – Bus stops – Sidewalk used as parking	– Wide enough sidewalk – Broken pavements – Obstructions like humps, vendors – No defined crossing and markings – No defined bus shelter in bus park area	– Wheelchair user – Crutch user – Visually Impaired	4	
8. Mahankal Temple	Morning (9:00-10:00) Afternoon (12:00-1:00) Evening	– Religious place – Pedestrian way – Sidewalk is used as parking	– No sidewalks in front of the Mahankal Temple – People are compelled to walk in road – Temple is not accessible to PWDs – Sidewalks are used as parking – -Broken pavements	– Crutch user	1	

	(5:00-6:00)	– Pedestrians move from roads	– No tactile markings – Level difference between road and sidewalk is high i.e.300mm – No Kerb ramps on crossings			
9. Along Tundikhel	Morning (9:00-10:00) Afternoon (12:00-1:00) Evening (5:00-6:00)	– Pedestrian way – Foot over bridge – Motorcycle parking	– Uniform width of sidewalks but in some places narrowed by foot over bridge which seem to be unsecure – Tactile markings are continuous – No placement of warning tiles in obstruction and level difference – Obstruction created by manhole cover of drainage – Sidewalks are used as parking – In some places pavements are broken – Public toilets are not accessible with 600mm door width and too high level difference between entrance door and sidewalks – Foot over bridge are slippery, riser height is more than 300mm and they are broken	–	–	

APPENDIX 3: MATRIX SHEET

S. No.	Comments by examiner	Response
1.	Review the prevailing by-laws and policies related to universal design and inclusive urban planning	Section 2.1 (Page No. 30-35)
2.	Classification of PWDS	Section 5.2.1 (Page No. 60)
3.	Detail out the observation of study area and classification of PWDs	Appendix 2 (Page No. 109-113)
4.	Site specific recommendations	Section 6.2. f. (Page No. 101) and (Page no. 15-25)
5.	Identify the problems and challenges faced by PWDs in using public transportation	Not in the scope of the research

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Accessibility in Public Spaces for Persons with Disability- A Case of Kathmandu Metropolitan City

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Abstract
Accessibility is the possibility of circulation and giving equal access to everyone. One of the problems of an urban area like Kathmandu is the inaccessibility to urban public spaces such as sidewalks, bus stops, pedestrian crossings etc. for people with all kinds of abilities. There is a certain group of people in society i.e. persons with disability (PWDs), who often struggle with the complexities of built environment (structural barriers) in urban areas that hinder their equal participation in daily activities. This research aims to identify the problems and challenges faced by PWDs in using the public spaces of Kathmandu. A review of literature and existing policies confirms that in the context of Kathmandu, there is a lack of comprehensive and holistic approach to ensuring accessibility for PWDs to public spaces. The findings made from direct observation, questionnaire survey and key informant interviews conducted during the research reveal several issues of urban accessibility in Kathmandu- such as unsafe, overcrowded and encroached sidewalks, hazardous obstructions for PWDs in public spaces, poorly maintained and improperly designed physical infrastructures etc. In addition, it is also concluded that the problems to accessibility seem to arise from the poor implementation of policies, lack of legal framework for planning, implementing and monitoring that accessibility mentioned in policies is ensured in action and a lack of coordination between the various authorities of government who share the responsibility of providing physical infrastructures and services.

Keywords
accesibility, persons with disability, public spaces, universal design, usability

1. Introduction

According to the United Nation Convention on the Rights of Persons with disabilities, around 10 percent of the world's population, or 650 million people, live with a disability and they are the world's largest minority group[1]. In 2011, around 2 percent (513,321 people) of the total population of Nepal reported as having "some kind of disability" [2]. According to the Census of Nepal 2011, Kathmandu has the biggest population of physically disabled and people with blindness/ low vision at 6,030 and 3,703 respectively. In Kathmandu, there is a severe issue of haphazard and unmanaged infrastructure development. The features of the city including physical design, institutional policies and mobility systems have prevented persons with disability (PWDs) from participating in mainstream urban social life. PWDs' participation in society is adversely affected by the city's infrastructural and architectural obstacles that limit their movements; and this will lead to breaking the link between this group and the rest of the society. Therefore, it is of utmost importance to develop the city as an inclusive, accessible urban environment that can truly be called a 'city-for-all'. Despite severe shortcomings, it is still the most developed urban area of Nepal and people from all over the country have and continue to pour here annually in search of better education, health care and employment opportunities. PWDs naturally form a part of this population.

1.1 Accessibility and Disability

Accessibility is a right as well as prerequisite for people living with different types of disabilities towards increasing their reach to any kind of facilities and services intended to support their participation in society[3]. Since the idea of accessibility is to minimize the physical effort and barriers of the PWDs, enforcing it is an integral part of infrastructure

development. It is the right of every individual to participate in daily, social and economic activities irrespective of their physical conditions and limitations. There are various international as well as national policies intended to guide the planning of any urban area to be universal and inclusive. However, at the stage of implementation and monitoring of urban development, accessibility for PWDs is often completely forgotten, creating barriers for PWDs in their social participation. Basic purpose of urban planning is to design spaces providing comfort, safety and quality to meet the needs, requirements and preferences of the users. The principles of accessibility and universal design address the requirements of the PWDs when it comes to the physical infrastructures in public spaces and they are: equitable use, flexible in use, simple and intuitive, perceptible information, tolerance for error, low physical effort and appropriate size and space for approach and use[4]. The physical impairments are generally the most obvious challenges to be met when addressing the problems of accessibility to the built environment. Those can be overcome by mainstreaming the concept of accessibility and universal design principles in urban planning and design.

1.2 Problem Statement

Various features of contemporary cities including physical design, institutional policies and mobility systems might have prevented disabled people from participating in the mainstream of urban social life[5]. PWDs' equal participation in social lives is adversely affected by the infrastructural and architectural obstacles in cities which limit their movements and lead to breaking the link between this group and the rest of the society. They become subject to unequal treatment merely because the urban built environment are not designed to meet their requirements and policies safeguarding their right of access to public spaces are simply disregarded or not implemented. In the context of Kathmandu, throughout the years, its urban spaces have never been built with universal utility design principles. Even though some parts of the city have pedestrian infrastructures that seem to be designed for the physically disabled people, they are not continuous, thus leaving the chance for PWDs to be stranded in the middle of nowhere. A lack of attention to the PWDs' physical and mobility needs is still one of the biggest challenges preventing their use of public spaces and access to possible independence.

2. Research Question and Objective

The main purpose of this research is to explore how the accessibility is implemented in urban planning in the context of Kathmandu. More specifically, this research tries to understand about the factors that have led to the poor implementation of PWD-friendly policies in infrastructure planning and its consequences. As such, the purpose of the research is to answer the following question:

How can accessibility be implemented in planning of public spaces in Kathmandu so that they become PWDs friendly?.

The main objectives of this research can be outlined as follows:

- To study the present condition of public urban spaces (sidewalks, bus parks, and open spaces) and infrastructures (bus stops, pedestrian crossings, foot over bridges/ subways, public building entrances etc.) in Kathmandu with regards to their ease of access and utilization by the PWDs
- To identify the actual needs and determine the problems encountered by PWDs in urban areas like Kathmandu when it comes to having accessibility to public spaces and infrastructures, places of services and transportation
- To review the existing practices of planning and policies related to inclusive urban planning and development

3. Methodology

The research, which is both qualitative and quantitative in nature, uses direct observation, questionnaire survey and key informant interviews as the tool to collect primary data and information about the existing condition of accessibility in Kathmandu and the problems faced by the PWDs. Qualitative data is utilized to support or expand upon quantitative data and adds to the description. The secondary data are extracted from available policy documents, previous studies, reports, books and journals and examples of national and international practices in accessibility. From extensive literature review, a framework matrix consisting of the best recognized parameters of accessibility and universal design principles is created, against which the existing conditions of accessibility

can be compared.

For the purpose of studying accessibility in Kathmandu, stretch area from Sundhara to Ratnapark, a commercial and transportation hub of Kathmandu city is chosen as a representative case. Streets around Ratnapark are one of the most crowded ones in the capital- the streets absorb everyone including the ordinary and the PWDs as the area lies in the center of Kathmandu and the streets not only serve the variety of functions related to people's daily lives but also provide gateways to many attractions in the area. The site area is divided into nine different zones based on land use and a data sheet consisting of date, time and number of persons is prepared to find the frequency of use by PWDs in each zone.

4. Site Overview and Data

4.1 Micro accessibility

The study area acts as a commercial, transportation and recreational hub of Kathmandu Metropolitan City. The public spaces are interconnected by a major street i.e. the street around the Tundikhel (see Figure 1). The study area connects commercial areas like New Road, Indrachowk, Ason, Mahabaudhha, Khichapokhari, etc. to the people from Kathmandu valley. Many people also use this street for their daily activities. This street acts as a major conduit of access to public buildings like hospitals (Bir Hospital and Trauma Center), shopping malls and government buildings and connects them to the transportation network of Kathmandu valley. Even though in the macro level, the public spaces along the street are accessible by public transportation from all over the valley, in the micro level, linkages to services and public space in the area of study are, however, not accessible to PWDs because of physical obstructions in the built environment and presently available infrastructures.

4.2 Frequency of Use by PWDs

The study area is divided into nine zones the basis of provision of services and use of land (Figure 2). Each zone of the stretch area was visually observed, and a data sheet was prepared to record and find out the frequency of use by PWDs in each zone. From the observation it was found that the fourth zone along Bir Hospital is the one mostly used by the PWDs. The concentration of PWDs is more towards the services and transportation facilities such as hospitals, shops, bus stops and crossings. During the observation, 5-6 PWDs were found to be using public spaces every hour. Among them, crutch users and visually impaired people seemed to outnumber the wheelchair users. The fact that the majority of the PWDs found in the area of study were crutch users is probably due to the presence of health services like Bir Hospital, National Trauma Centre, and the Army hospital in the area. The majority of PWDs were found to be of age group 20-30 years, an economically more active and physically stronger group compared to other age group. The majority of the PWDs were unemployed and lacked proper education and training as they are deprived of physical and social infrastructures that are conducive to their educational needs.

4.3 Evaluation of Existing Condition of Public Spaces

Sidewalks

As the area is located in the commercial center of Kathmandu, it accommodates a large volume of pedestrian traffic every day and gets especially crowded during major festivals like Dashain, Tihar, etc. In most of the areas, widths of sidewalks are sufficient but in some, they are too congested for large volume of pedestrian traffic. In most areas, pavement blocks were broken or removed, creating uneven surfaces that might lead to accidents or injuries to crutch or wheelchair users and visually impaired people. Haphazard placement of overhead pedestrian bridges in the area has made the sidewalks congested and narrow. Tactile tiles are provided with directional and warning tiles in each segment of the sidewalks; however, in most of the places they are discontinuous and lead to physical obstructions like trees, broken pavements and drainage covers on the sidewalks. The level difference between sidewalks and road is high i.e. 230-300 mm and lack ramped kerbs. Sidewalks are also encroached by tree plantation, construction works, electric poles, vendors and parked vehicles. Thus, the experience of PWDs in using the sidewalks is not seamless as they face different hurdles during movement. Compared to the standards of accessibility which emphasize equitable, flexible, and intuitive use of public spaces as well as require them to have perceptible information, tolerance for error and be of approachable size and space, the existing sidewalks do not meet them even at the minimum.

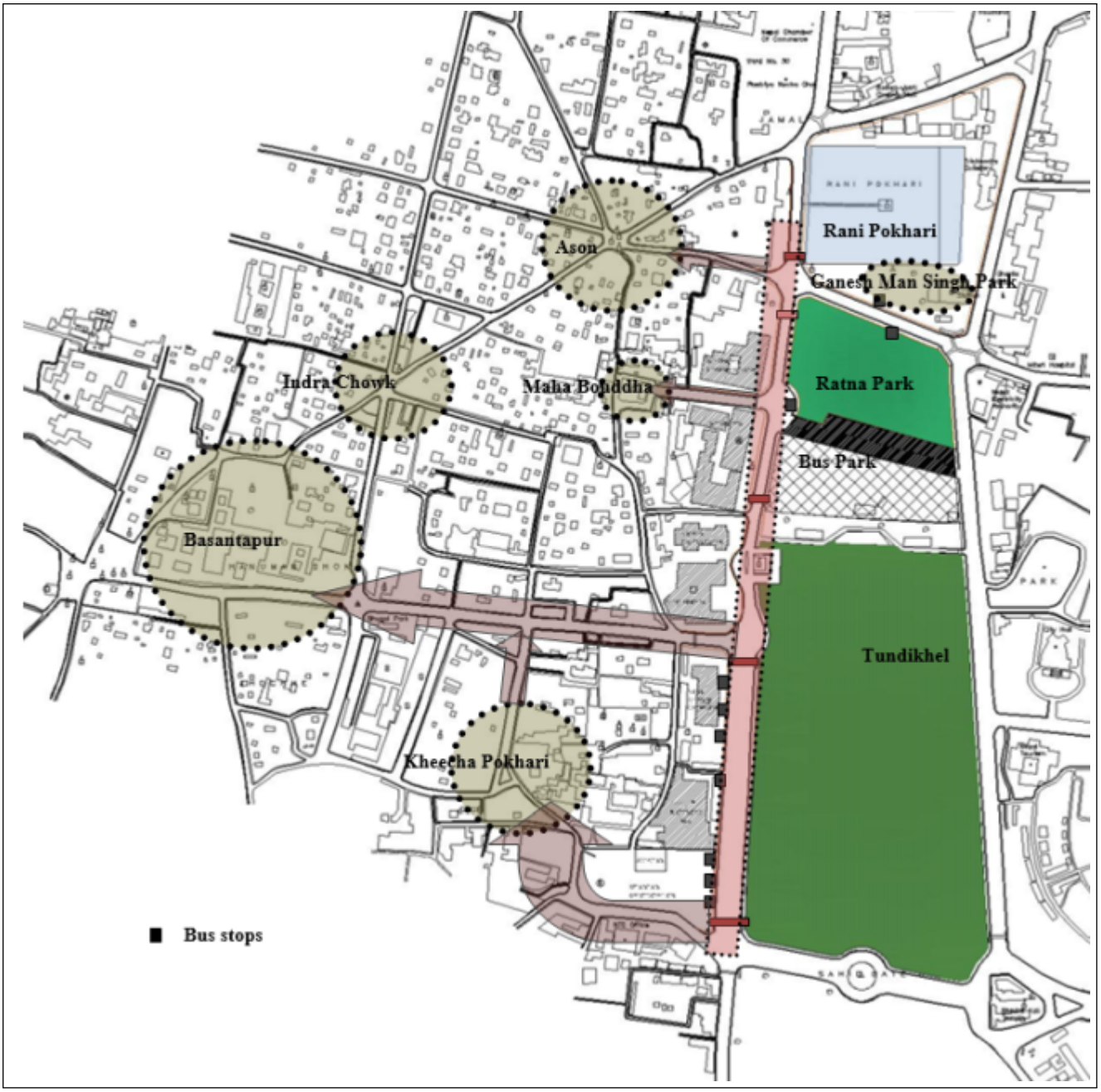

Figure 1: Interlinkage between the services and public spaces in the area of study

Pedestrian Crossings

The road crossings are not properly indicated with zebra crossings and signage in the intersections. The level difference between roads and sidewalks is too high for wheelchair users. Pedestrian crossings also lack directional and warning tactile tiles. Pedestrians seemed to be crossing the roads haphazardly and PWDs do not feel safe while crossing the roads.

Bus Stops

A bus stop is the first point of contact between passengers and bus services. There are three bus stops in the study area, with nine bus waiting shades- seven in Sundhara, one each in Ratnapark and opposite to Ratnapark. These bus stops serve bus routes to and from various places of Kathmandu like Gongabu, Balaju, Imadol, and Budhanilakantha etc. All bus stops are connected to the sidewalks and lead to public buildings with commercial purposes and hospitals. The existing pavements at bus stops are broken and kerbs are too high; bus stops lack

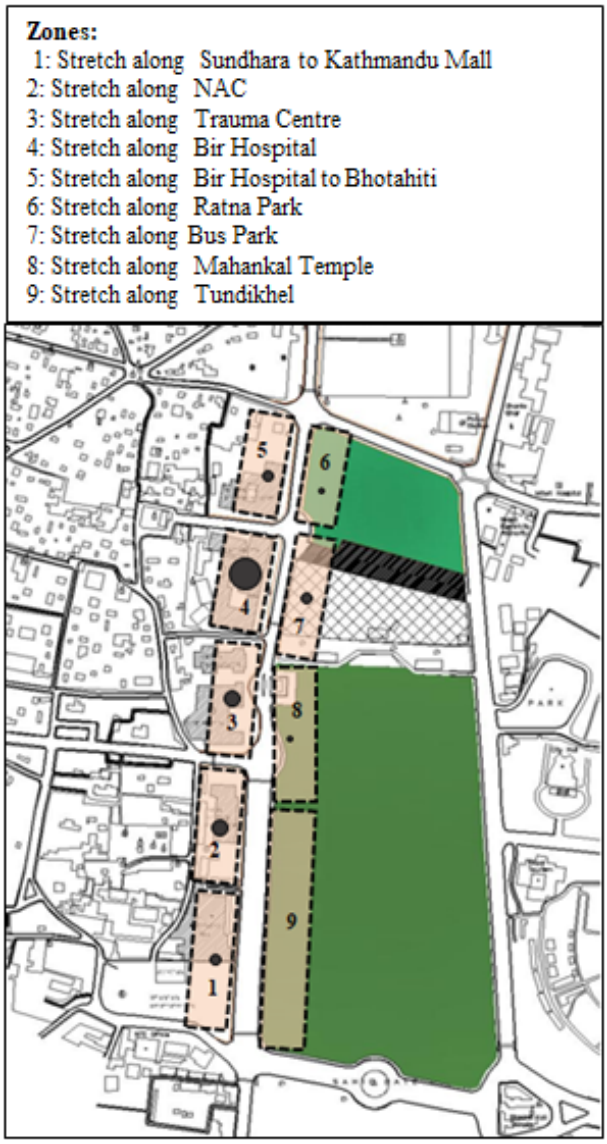

Figure 2: Division of the area of study into zones for observation; the size of the bubbles are proportional to the number of PWDs observed in the zone; smallest =1 person, biggest =12 persons

information about bus routes and auditory cues; and bus shades are improperly designed. The PWDs do not feel that the bus stops are accessible to them.

Subways or Foot Over-bridges

The study area consists of three pedestrian bridges and one subway, all of which are not accessible to PWDs. They lack even the minimums of accessibility such as ramps, tactile markings and riser height. The bridges have slippery treads and subways are encroached by shops and both are in poor physical condition. PWDs do not feel safe using the subways and foot over-bridges.

Public Building Entrances

Within the area of study, there are different public buildings such as Dharahara (under construction), Kathmandu Mall (commercial building), Nepal Airlines Corporation (government building), Nepal Army Hospital, Trauma Center and Bir Hospital (hospital buildings). The linkage between roads, sidewalks, bus stops and these buildings are defined but adjacent sidewalks are not accessible to PWDs. The sidewalk connects the major components of the public spaces to the transportation networks.

Open Spaces/ Parks

Ratna Park, Ganesh Man Singh Park and Tundikhel are the major parks and open spaces in the study area which are accessible from the transportation network. Although the internal part of Ratnapark and Ganesh Man Singh Park are designed in consideration with the requirements and needs of PWDs, Ratnapark still lacks ramps and sufficient width of gate in the entrance making it inaccessible to the PWDs from outside. In that respect, Tundikhel can be considered accessible to PWDs.

Bus Park

The study area includes the Old Bus Park which connects the area with other places of Kathmandu valley. The bus park caters to the transportation from nearby places as well as places as far as Dhulikhel, Banepa and Thankot. Accessibility to the area is poor because the buses are haphazardly parked and do not have designated stops for pedestrians. The signage and information about the routes are not clear to the people. The surface of the bus park is broken and not even which makes it inaccessible to wheelchair users.

Public Toilets

Within the area of study, there is provision of three toilets- one outside Ratna Park and two under separate foot over- bridges. The public toilet outside Ratna Park is somehow provided with ramps for wheelchair users but is hardly usable as it is does not meet the required standard of ramp width and gradient. Toilets under the foot over- bridges are too congested and do not have enough width of 600 mm at entrances and are in poor condition.

5. Analysis and Discussion

5.1 Analysis Based on Observation

Each zone of the study area was observed to find out which segment is the one mostly used by PWDs within the study area. The segment along Bir Hospital, National Trauma Centre, and Nepal Airlines Corporation is the one most frequently used by PWDs. This was probably due to the presence of one of the largest hospitals of the country. The sidewalk along the hospital building in this zone also links the Kathmandu valley to the major commercial area comprising New Road, Ason, Indrachowk and Kathmandu Durbar Square. The facilities such as bus stops and public buildings are also lined up in this portion; so this stretch is most frequently used by the PWDs. On detailed and timely observation, it was found that the zones along Tundikhel were not as frequently used by the PWDs. The sidewalks on those segments are also relatively continuous, wide enough to use, with intact pavements and had tactile makings without obstruction. This might be due to the relatively less wear and tear resulting from less frequent use by pedestrians because of an absence of services and facilities like bus stops, public buildings, and commercial area, etc on that side. The major findings made from the observation can be outlined as follows:

- The frequency of use of public spaces depends on the services and facilities provided in the area
- The land use (commercial, institutional, open spaces, etc.) and transportation infrastructures (bus stops, bus parks, etc.) play a major role in the vibrant use of public spaces
- The physical condition of infrastructures deteriorate when they are frequently used
- The public spaces, their infrastructures and elements of accessibility need to be maintained regularly and systematically over time to keep them safe to be used by PWDs

When the site conditions of the public spaces in the area of study are compared with the principles of accessibility outlined in Section 1.1, they do not meet the criteria required to be considered providing accessibility. This shows that the physical infrastructures are not designed and planned to meet the issues and requirements of PWDs, and a long term vision and continuity in infrastructure development is lacking.

5.2 Analysis based on Questionnaire Survey

Problems Faced by PWDs

As shown in the chart in Figure 3, for the majority of the PWDs, the most common problems in using the public spaces accessibly were that they were overcrowded and had broken pavements. Similarly, poor conditions of roads and pathways (for example, pathways being discontinuous and intermittent) are also significant problems faced by all types of PWDs. The fact that many PWDs also point out to the absence of adequate or designated pedestrian crossings show that not even the most basic aspects of accessibility are fulfilled in the public spaces of Kathmandu. Designating and maintaining pedestrian crossings should, in theory, have been one of the most economical solutions to providing accessibility. However, the absence of them shows that the problem is not economical but that of recognition, policy, implementation and willpower.

Challenges Faced by PWDs

For most of the PWDs, the major challenge in using public spaces is the issue of a lack of safe pedestrian infrastructures (Figure 4). Almost an equal number of them could also clearly see that the lack of co-ordination between government bodies is responsible for creating challenges to their accessibility to public spaces. The PWDs could also clearly feel that the policies enabling accessibility are poorly implemented in practice. The responses given by the PWDs regarding the challenges faced by them in terms of accessibility to the public spaces show that there is not ‘one particular’ problem or a challenge but a multiple of them with various facets to them. The problems and challenges relate to both the physical infrastructures and facilities as well as to the policies, acts and guidelines and the lack of their implementation.

5.3 Analysis Based on Key Informant Interviews

Researcher’s interview with different people and experts involved in the advocacy and planning of accessibility revealed barriers to accessibility that were structural, institutional and social in nature. Laxmi Gurung, a vendor with low vision who is also a member of an organization of the Blinds and advocate of women’s rights, has faced social barriers such as discrimination in family and deprivation of education

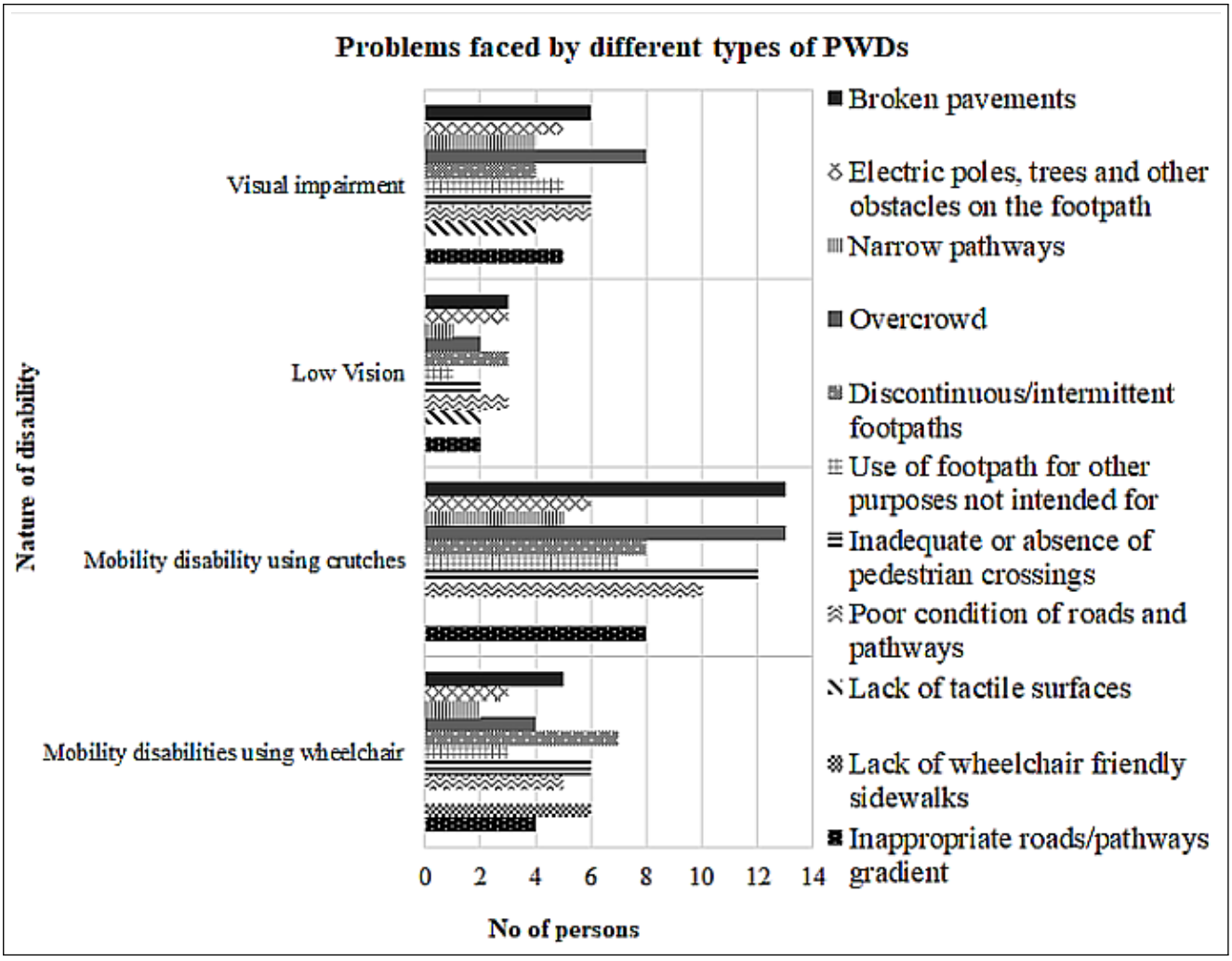

Figure 3: Various problems faced by PWDs according to their nature of disability

due to the lack of infrastructures that met her needs. She has also faced attitudinal barriers in her daily life; for example, people are reluctant to respond to her when she asks about routes and directions in public transportation.

Bimal Paudel, an accessibility expert in National Federation of the Disabled- Nepal (NFDN), pointed out that it does not cost fortune to make PWDs-friendly infrastructures and may cost merely 5-10% more than the present total cost, but a lack of mandatory rules for the implementation of acts and policies safeguarding the rights of accessibility meant that for the PWDs, accessibility was a dream limited to paper.

Milan Bagale, another accessibility expert in NFDN was of the opinion that the driving principle of accessible infrastructure development should be that of 'universal design' instead of just 'disabled friendly design' so that the public spaces can be used by person of all kinds of abilities.

Similarly, Rabindra Rai, an engineer at Kathmandu Metropolitan City (KMC), informed that the responsibilities of providing and maintaining different services and infrastructures in the city are given to various authorities of the government depending on size and sector and the problems of accessibility mainly stem from a lack of coordination and common approach between those authorities.

Anjan Raj Shrestha, an architect at Design Cell, lamented that the government has failed to adhere to a long term vision in physical infrastructure development, has failed to acknowledge the importance of public-private partnership in guaranteeing accessibility and has also failed to take ownership of accessibility interventions made by the private sector.

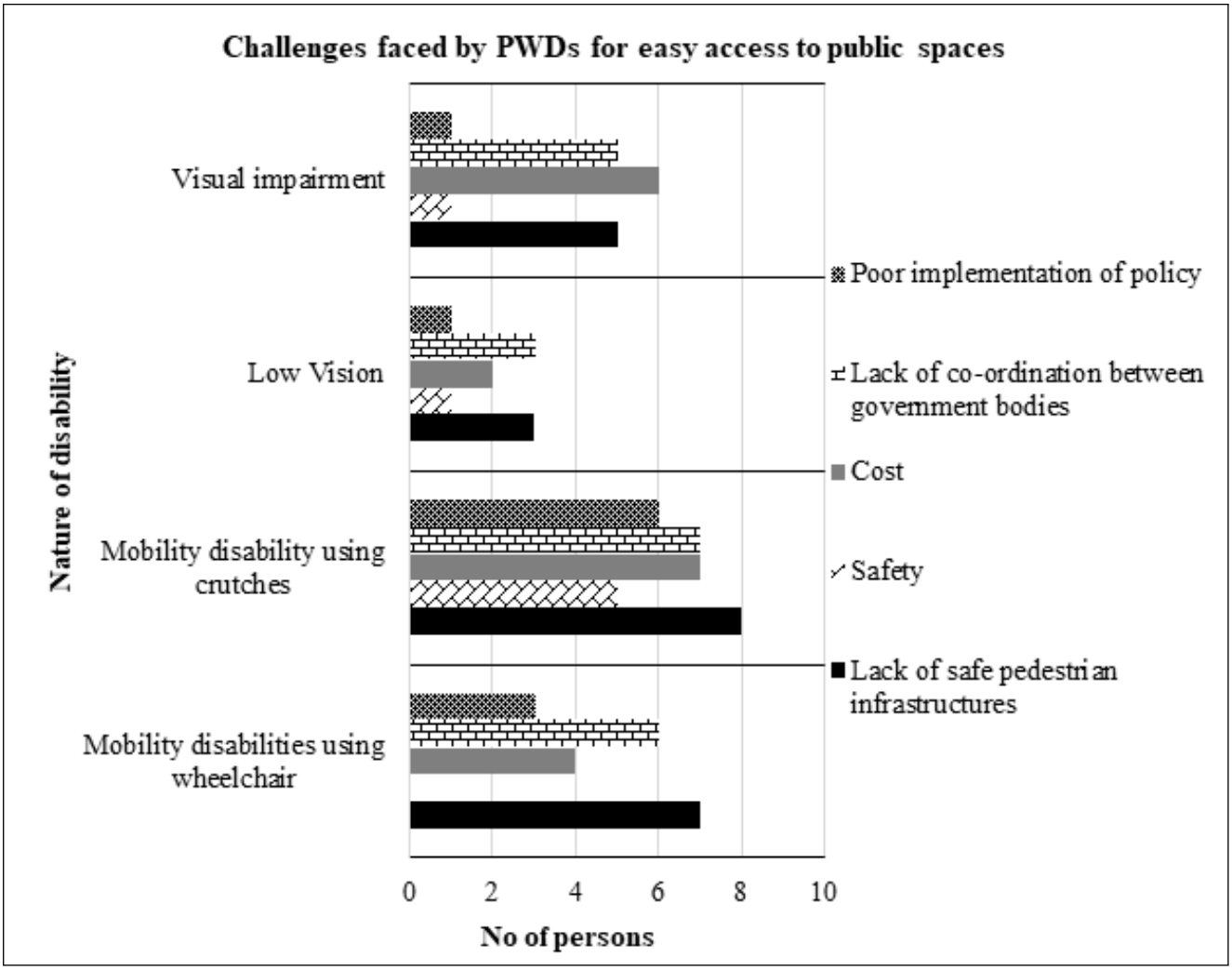

Figure 4: Various challenges faced by PWDs according to their nature of disability

6. Findings

Findings from the survey and interviews point to the existence of serious problems with respect to accessibility of PWDs to the public spaces such as sidewalks, bus stops, pedestrian crossings, foot over bridge/sub ways, etc in the city of Kathmandu. These problems prevent them from equal participation to social life by creating barriers that impede their pedestrian movement, usage of means of transportation, and access to services and commerce. Major factors that have led to barriers to physical infrastructures can be summarized as follows:

- Poor existing conditions of public spaces and physical infrastructures which do not meet the minimum standards of accessibility for PWDs
- Whatever of the few interventions intended to make public spaces accessible, are made without proper planning and neglecting the requirements of PWDs, and hence are sporadic, not continuous and even lead to obstructions and hazards
- Poor maintenance of public spaces and infrastructures which have resulted in them being unsafe and sources of physical injuries to the pedestrians, especially the PWDs
- Lack of coordination between the government and development authorities such as the municipality, Department of Roads, Nepal Electricity Authority, KUKL, etc. as they blame each other for the causes of unplanned and haphazard construction of physical infrastructures in the city
- Lack of awareness among the government authorities regarding the importance of co-ordination between them
- Policies lacking comprehensive and holistic approach to accessibility in public spaces as the concept of inclusion is still new to Nepal

- The existence of the statement "PWDs friendly infrastructure" in every policy document merely in words but failing to concretely outline the design standards and guidelines about the ways of making the infrastructures PWDs friendly in action
- Lack of knowledge and attitude of negligence amongst the designers, planners and decision makers about the existence of accessibility and mobility standards and their usability, applicability and universal utilization value
- Insufficient by-laws which obligate the concerned professionals to make public spaces and physical infrastructures accessible for all
- Lack of long term vision on the part of government agencies in the development of public spaces and physical infrastructures
- Lack of a dedicated monitoring body of government due to which there is not only the lack of the up-to-date information about the present conditions of accessibility but also a failure to monitor the design and construction of infrastructures and services
- Lack of involvement and consultation with PWDs in planning and design as well as implementation phase in order to mainstream the ideas of mobility and accessibility in the built environment. So far, they have had to satisfy with only token representation in some policy making processes.

7. Conclusion

The concept of providing equal access and accessibility in built environment focuses on making the necessary changes for PWDs who have more limited opportunities to take advantage of services and facilities than others. This research made an attempt to explore the conditions of accessibility and the problems and challenges faced by PWDs in public spaces of Kathmandu by choosing one of its busiest areas as the site of study. The major barriers to accessibility for the PWDs identified in this research are institutional and structural (built-environment), which mainly show the lack of institutional enforcement and monitoring in physical infrastructure development in Kathmandu.

The pedestrian infrastructures and services in Kathmandu often do not meet the required standards of quality (such as usability, durability etc.), and are not safe and comfortable to be used by people with all kinds of abilities. Infrastructures in those public spaces have been instead, identified as providing continual barriers to the usability of urban space in KMC, especially to the PWDs. The PWDs do not feel safe while using the sidewalks and pedestrian bridges because of physical obstructions such as encroachment, broken pavements, inappropriately located bus stops etc. Such hurdles not only compromise the safety of PWDs but also burden them and possibly their families financially as the cost of maintaining mobility devices like wheelchairs, crutches and walking sticks is not paltry.

Although, few interventions like placement of tactile markings (directional and warning) and provision of ramps in public building entrances are seen to have been made, they are only sporadic, are not easily usable by the PWDs and in turn contribute to the confusion rather than solution. This clearly shows that there is an attitude of negligence on the part of the authorities of implementation and that the usability and safety factor of infrastructures are not at all considered in design and planning processes. The problems also seem to arise from the lack of coordination between the various authorities of government who share the responsibility of providing physical infrastructures and services in the city and their intent to find loopholes to do away with the implementation of accessibility standards and designs outlined by the prevalent policies. As an outcome of this research, the ways in which accessibility can be improved upon and implemented in the planning of public spaces in Kathmandu are proposed as recommendations in Section 8 further below.

PWDs should no longer be treated as just a minority group and their problems with mobility, accessibility and usability should be recognized as society's common agenda in the mainstream urban planning and design. Urban planning could and should play a vital role in improving the conditions of accessibility to the built environment by removing existing physical, institutional and social barriers in order to benefit the PWDs just like the rest of the population and to ensure their equal participation in society. Otherwise, inaccessible public spaces and barriers around us will mean the continued struggle for PWDs to guarantee their economic independence and the fulfillment of their human rights.

8. Recommendations

After analyzing the existing conditions of accessibility for PWDs to the public spaces in Kathmandu through observation, questionnaire survey (of PWDs) and interviews with key informants, the following recommendations are deemed important to be made to improve the standards of accessibility in the city:

a. Legal framework on implementation and monitoring of physical infrastructure development

In Nepal, there are various policies that are intended to ensure accessibility in public spaces but what is critically lacking is a strong legal base for implementing the policies into action and then monitoring that those are implemented. A strong legal framework can direct and obligate any infrastructure development authority to implement and periodically monitor the conditions of accessibility as specified in the policies. There are a few initiatives taken by the government to promote inclusive development on the surface but fail to detail out how the requirements of inclusive development are to be met at the grass root level.

Most of the problems of accessibility to public spaces in Kathmandu could be solved if there were better co-ordination between the different authorities of the government. A lack of ownership of the ideas of accessibility from the different government authorities responsible for infrastructure development was a major problem identified in this research. Such a situation must be thus addressed by laws which mandate the undertaking of responsibilities by authorities as well as the necessary coordination between them.

b. Design standards and guidelines incorporated in building code and by-laws

Design standards and guidelines are sets of recommendations intended to ensure a good practice in design of any space. They are intended to provide clear instructions to designers and development authorities on how to adopt specific principles, such as universal design, accessibility, mobility, etc into their designs. However, in Nepal, there are very few guidelines; even the ones stated in the 'Accessible Physical Infrastructure and Communication Services Directive for PWDs (2069)' provided by MOWCS is not able to accommodate all the aspects of accessibility. These guidelines, and if they are not enough, various other international standards of accessibility should be made mandatory in building codes and bylaws to be followed in every approval of urban space and infrastructure development maps.

The design standards and guidelines for accessibility should specifically include the requirements to be fulfilled for public spaces such as sidewalks, bus stops and parks, pedestrian crossings, parking, public buildings (hospital, commercial, etc.), recreational parks, open spaces etc. and provide detailed narratives to the designers so that they can follow them word-by-word.

c. Public-Private Partnership in infrastructure development

The research found that some of the design and development works promoting accessibility were done by private sector in co-ordination with the government but were later not conserved by the government authority (e.g. DOR) itself. The government and its concerned authorities should take ownership of such initiatives taken by the private sector and utilize as good examples. The government should protect and improve the provisions of existing infrastructures, especially when they are developed by private sector in coordination with itself. Service providers like hospitals, educational institutions and commercial organizations should co-ordinate with the government authorities to provide accessible facilities and services in outdoor spaces that connect people from major road networks and transportation centers to the gates of service providers.

d. Involvement of PWDs in planning, implementation and monitoring level

Although there is involvement of PWDs and activists advocating for the wellbeing of PWDs in planning and policy making level, they rarely seemed to be consulted and given a role in implementation and monitoring phases. The result is poor physical infrastructures which do not meet most of the criteria of accessibility and usability. It should be the PWDs who are given leading role in monitoring whether the public spaces are fully accessible to them or not.

e. Awareness among public for behavioral changes towards PWDs

The research found that a significant section of the general public did not feel responsible towards PWDs; for example, those vending and parking in the

sidewalks who did not seem to be aware or care about the barriers created by them for the PWDs. They fail to realize that even small encroachment on public spaces can impact the safety, comfort, mobility and accessibility of a PWD. So, it is necessary to bring awareness raising programs to the public in order to make them realize how their small actions of irresponsibility can cause huge losses to the PWDs.

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