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RESEARCH ARTICLE

Assessing Accessibility Completeness in Public Open Spaces for People with Disabilities in Pokhara Metropolitan City, Nepal

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ABSTRACT

Public open spaces (POS) foster social interaction and enhance urban livability. However, these spaces often remain inaccessible to people with disabilities (PWDs), particularly wheelchair users and individuals with visual impairments. This study assesses the accessibility and suitability of POS in Pokhara Metropolitan City (PMC), focusing on identifying barriers and proposing improvements. Using a mixed-methods approach encompassing field observations, GIS mapping, and Focus Group Discussions (FGD), seven purposively selected POS were evaluated against key accessibility criteria. Findings reveal that while some POS accommodate wheelchair users, infrastructure for the visually impaired, such as tactile pavements, is entirely lacking. Uneven pathways, poorly designed restrooms, and inadequate signage further limit usability. The study highlights the need for comprehensive planning and policy reforms to promote inclusivity and universal design principles. Recommendations include installing physical pavements, improving restroom facilities, and involving PWDs in POS design processes. These efforts aim to create accessible and inclusive public spaces that enhance the quality of life for all.

KEYWORDS: Accessibility, public open spaces, people with disabilities, wheelchair users, visual impairments, inclusive urban design

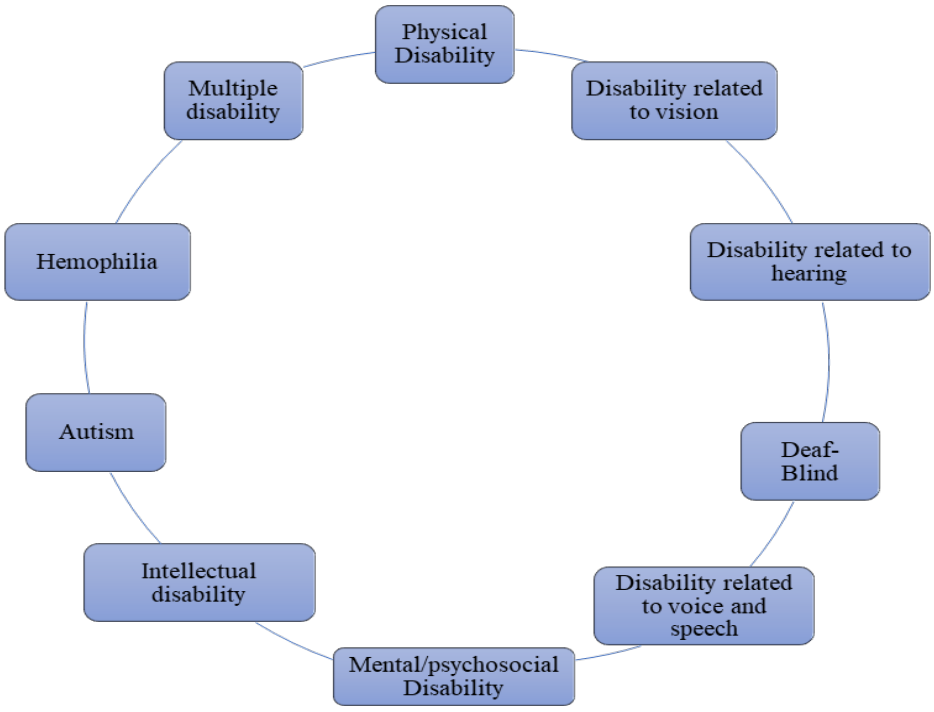
INTRODUCTION

Public open spaces are publicly owned areas that do not require payment and have no profit motive (UN-Habitat, 2018). Numerous scholars have directed their attention towards highlighting the fundamental principles that support the development of good public spaces which will be capable of appealing to a diverse range of people by virtue of their adaptable nature, building's diversity, and ease of access (Alsumsam, 2017). Well-designed public spaces enhance the value of surrounding properties and provide accessible spaces for

community engagement (Thompson, 2002). It has become an important aspect of urban life globally that postures the essential need for public space depending on the spatial and social fabric of a city, regardless of the variations experienced across the globe (Madanipour, 2010). There is a minimum limit of 9m² per capita green space set by the World Health Organization (WHO), 26m² by the European Union (EU) and 30m² by the United Nations (UN) in an urban areas for healthy living (Shahfahad et al., 2019). Parks are freeware providing relaxation and environmental interaction promoting people's engagement in exercises and other social activities in the community (UN-Habitat, 2018) making it very crucial in urban areas (Sakip et al., 2015). Everyone, including those with the physical or mental disability, should have easy access to POS (Aini et al., 2019). Sustainable Development Goals (SDG) Target 11.7 emphasizes the need for inclusive, accessible, and green public spaces for all, including women, children, the elderly, and persons with disabilities by 2030 (UN-Habitat, 2018). However, most landscapes and urban areas remain shaped by socioeconomic, political, technological, environmental, and cultural factors (Burgi et al., 2005), often disregarding the needs of PWDs. The needs of open space have become a foundation for public life; without public spaces, residents may experience isolation from one another (Carr, 1992).

Figure 1

The Category of Disability in Nepal as Recorded in NSO, 2021



Note. Adapted from NSO, 202, p. 184.

The suitability of public open spaces (POS) in Pokhara Metropolitan City (PMC) for people with disabilities (PWDs), particularly those with visual impairments and wheelchair users, is a critical aspect of creating an inclusive urban environment. The suitability of POS in PMC for PWDs is critical for inclusivity. Many popular sites, such as Phewa Lakeside and Basundhara Park, lack essential accessibility features,

including physical paving and ramps. Identifying and addressing these barriers can help create safer, more inclusive urban environments.

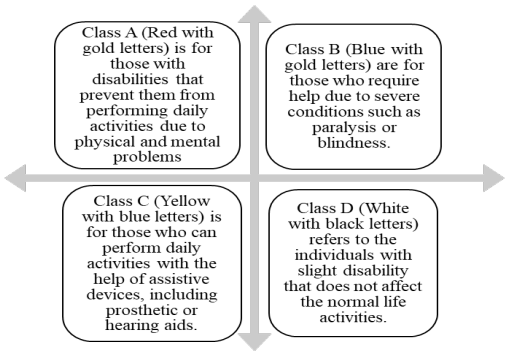
According to National Federation of Disabled-Nepal, (2017), "Persons with disability" means those who have a reduced capacity to participate in a range of life activities because of one or more physical or mental impairments or other temporary or permanent conditions that harm their functioning. The UN regulations provide equal rights for people with disabilities (PWDs), addressing the issues and concerns on international human rights and helping to formulate the programs for equal access (Esfandfard et al., 2020). Figure 1, represents the ten categories of disabilities that has been categorized by the Government of Nepal, based on its nature and severity.

The Government of Nepal has issued a disability identity card in accordance to with the Act 2074 to get health, education, employment, and inclusion for persons with disabilities which are classified into four types (Figure 2) (Deafnepal, 2021). People with disabilities (PWDs) struggle to move freely in public spaces because of physical barriers in the environment, overcrowded and narrow sidewalks also many places don't have PWD-friendly sidewalks. Accessibility is the prerequisite for assessing suitability for PWDs in POS as it enhances the participation. It points out that there are physical barriers, which would make access to the facilities limited for some people with disabilities, the aged, pregnant women, etc. (Yousefi & Fardi, 2016).

Research shows that Kathmandu Metropolitan City lacks safe and accessible infrastructure for PWDs, with public spaces suffering from poor maintenance and design (Wagle, 2020). There is no enforcement of policies and a legal framework for accessibility measures is lacking, as well as integration between different government branches that are involved in the provision of infrastructure and services. To understand the public spaces and their contributions to people's lives and their urban design futures, it is crucial to thoroughly investigate (Francis, 2003). There is still a lack of understanding regarding the ability of people with disabilities to have a positive influence through their engagement in public spaces.

Figure 2

Category for Identity Card for PWDs



Note. https://deafnepal.org.np/en/

Public open spaces play a key role in promoting social interaction and well-being. However, people with disabilities (PWDs) often face challenges accessing these areas because of mobility issues, limiting their opportunities for social inclusion (Aini et al., 2019). Some studies have explored open spaces in Pokhara, such as *Open space: Typology and distribution in Pokhara-Lekhnath Metropolitan City* (2018), *Pathways and magnitude of change and their drivers of public open space in Pokhara Metropolitan City, Nepal* (Pokharel & Khanal, 2020), and *Accessibility in Public Spaces for Persons with Disability: A Case of Kathmandu Metropolitan City* (Wagle, 2020). However, most research has focused on Kathmandu Valley, leaving a gap in understanding the situation in Pokhara. Therefore, it is important to assess the current state of public open spaces in Pokhara to identify barriers for PWDs and recommend improvements.

LITERATURE REVIEW

The studies reviewed focus on various aspects of accessibility and sustainability in urban and natural environments. Mitropoulos et al. (2023) introduce two indices to assess urban accessibility in Central Athens, revealing moderate accessibility and advocating for local improvements. Ahirrao and Khan (2021) examine public open spaces in Nagpur, highlighting social cohesion but also the lack of equitable access and sustainability, recommending greater inclusivity. Kapsalis et al. (2022) focus on the challenges faced by mobility assistive device users in urban spaces, emphasizing the need for inclusive design to enhance participation and autonomy. Giuliani et al. (2021) propose using satellite imagery and Earth observations to assess green area accessibility across European cities, presenting it as a reliable and cost-effective approach to support urban sustainability goals. Ramírez et al. (2024) explore the factors contributing to the valorisation of heritage sites, underscoring the role of sustainable mobility and socioeconomic factors. Lastly, Groulx et al. (2023) highlight barriers to accessing natural spaces outside cities for individuals with disabilities, advocating for adaptive strategies and inclusive design to improve accessibility in protected natural environments.

Several studies have explored accessibility, equity, and environmental factors in urban and natural spaces. A scoping review highlights the challenges faced by individuals with disabilities in accessing natural environments and proposes inclusive design and adaptive strategies for parks and protected areas (Groulx, Freeman, & Lemieux, 2023). Another study evaluates access to urban green spaces across 254 cities in China, identifying significant disparities and suggesting targeted interventions to improve equity (Rao et al., 2022). The relationship between green space proximity and physical activity was analyzed, showing that closer access encourages physical activity and health benefits, while larger green spaces may negatively impact activity levels (Cardinali et al., 2023). In Ethiopia, urban green infrastructure faces challenges such as rapid urban growth and land-use violations, highlighting the need for greater prioritization to achieve Sustainable Development Goal 11 (Gelan & Girma, 2022). Disparities in sidewalk quality were examined, revealing that marginalized communities often experience poorer infrastructure, which limits safe transportation options (Rajaee et al., 2021). A GIS-based system for assessing public open spaces for emergency shelter use was introduced, emphasizing the importance of equitable distribution to strengthen disaster preparedness (Yao et al., 2021). Finally, strategic planning for barrier removal was advocated to improve accessibility in pedestrian infrastructure for individuals with disabilities (Echeverri et al., 2022).

METHODS AND MATERIALS

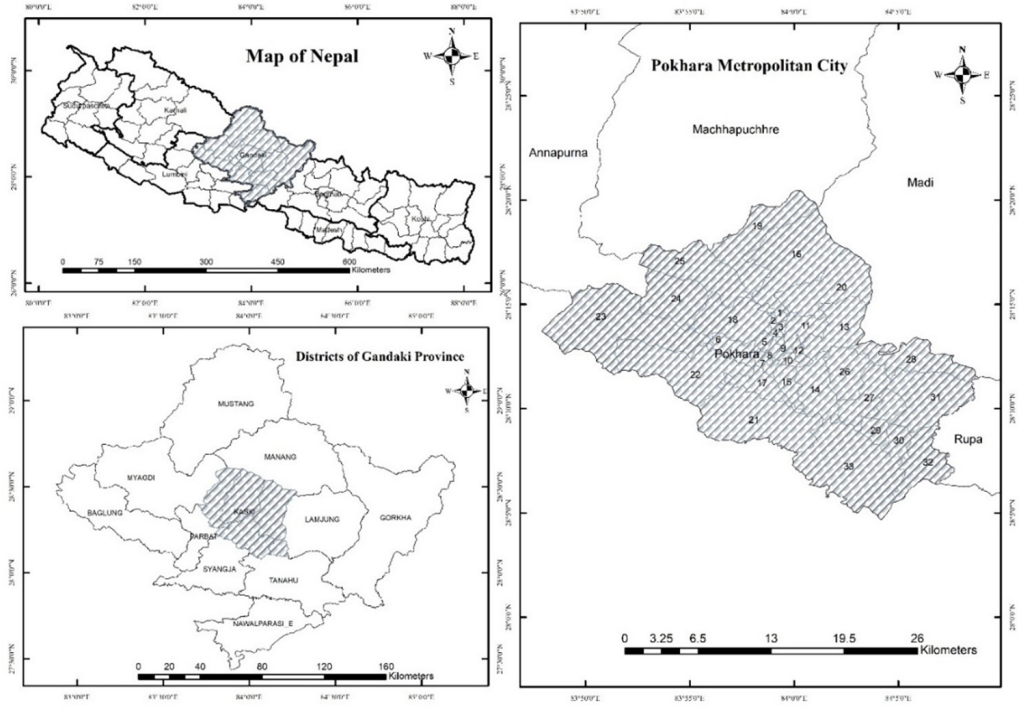
Study Area

The public open spaces of Pokhara Metropolitan City (PMC) are taken as the research area which is the largest urban area covering 464.24 square kilometers, located between 28°04″39.91′ N to 28°20″27.75′ North Latitude and 83°47″54.35′ E to 84°08″52.07′ East Longitude with the elevation from 502 meters (Kotre) to 2651 meters (Armala), further divided into 33 wards (Figure 3). The valley floor of the Pokhara area is in the moderate subtropical climate zone (Lamichhane, 2008), however, Pokhara or the South Asian region of Nepal has been classified in the sub-tropical climatic zone based on global climatic zones (Paudel, 2020). The research is limited to POS of the valley floor, purposively selecting the popular open space of different typologies viz religious site, park, garden, museum and stadium where the collection of data relied on observational methods limiting the generalizability of findings. It focused on two categories of

disabilities; those with visual impairments and wheelchair users (physical disability). It did not consider seasonal variation which is crucial in affecting accessibility.

Figure 3

Location Map of Study Area Pokhara Metropolitan City, 2024



Note. Topographical Maps (1998, 2017), Government of Nepal.

Methods of Data Collection

This study employed a mixed-methods approach, integrating qualitative and quantitative data collection techniques. The collected data are comprised of checklist-data with on -site observation and Focus Group Discussions (FGD) with the most frequent visitor on the POS, for evaluating the accessibility from seven open space patches for PWDs. Since recommendations or suggestions for improvement have to be made for the proper execution of the work, documenting one's findings makes literature review useful and experts' opinion.

The disabilities are categorized into 12 groups (NSO, 2021), but this research focused specially on two groups: wheelchair users (physical disability) and visual impairment. The research area included 272 purposively selected POS in PMC: Basundhara Park, Dam Side Park, Tal Barahi Temple, Bindhyabasini Temple, Parsyang Bagaicha Park, International Mountain Museum Park, and Pokhara Stadium. These areas were selected based on their public significance, high footfall, and varied typologies (e.g., religious sites, parks, museums, and recreational spaces)

Data Collection

Field observations. A structured checklist was used to assess accessibility features (e.g., ramps, tactile paving, accessible restrooms).

GIS mapping. POS locations and accessibility barriers were mapped to visualize spatial distribution.

Focus group discussions (FGD). Conducted with frequent visitors, including PWDs, to understand user experiences and challenges.

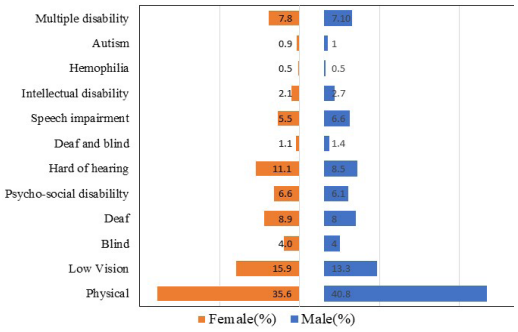
RESULTS AND DISCUSSION

According to the World Health Organization (WHO), it has clarified that approximately 500 million people, constituting 10 percent of the global populace are disabled (Meshur, 2016). Likewise, PMC recorded 1.9 percent (12,362) individuals, out of this 6,688 were male and 5,674 were female recorded as people with disabilities (PWDs) in the census year 2021 (NSO, 2021).

Figure 4, provides valuable information on disability landscapes with different types in PMC and also the dispersion in between male and female as recorded in the census year 2021. Most notably, both genders are accounted for high in the disability with physical disability showing its most common type of disability, followed by low vision and hearing impairment (including hard of hearing and deaf). The statistics say that the incidence of hemophilia is low, meaning there are very few sufferers in the general population. This is probably due to the fact that hemophilia is a rather rare factor deficiencies and hereditary platelet abnormalities (Satapathy, 2019).

Figure 4

People with Disability by Type in Percent, PMC, 2021



Note. NSO, 2021

In recent years, many research works have been published globally on the barriers and opportunities experienced by persons with physical disabilities (Chidiac & Marjaba, 2021) and visual impairments in different environments. A study done by Pokharel (2022), showed 275 open spaces in PMC. Before coming to suitability for wheelchair users (physical disability) and visual impairment, the overall accessibility has been assessed as shown in Table 1.

Table 1 illustrates the parameters that have availability in the study area's open spaces. The data is obtained through observation by filing the checklist. The recorded data are from a general perspective, it doesn't imply to specific group. The listed spaces are Basundhara Park, Parsyang Bagaicha Park, Bindhyabasini Temple, Dam-side Park, International Mountain Museum Park, Pokhara Stadium and Tal Barahi Temple. From the table, it is evident that the majority of the public places are accessible, have compound walls and are provided with roads and lights. Nevertheless, special parking facilities are missing in Damside Park, and water facilities are also missing from Basundhara Park and Damside Park.

It is equally important to note that visitor numbers differ in these study area, the visitor's frequency differs a lot within these areas with the Pokhara Stadium attracting the highest visitors per day with a record of 2700 visitors and Parsyang Bagaicha Park holding the lowest record of 100 visitors per day. It ranges from relatively flat grounds found in most parks to hilly grounds as observed at Bindhyabasini Temple and an island at Tal Barahi Temple. The general physical environment is clean across the different areas suggesting a well-cared environment. However, the level of security is not the same, and it is noticeable that such facilities as Damside Park and Tal Barahi Temple do not have security measures at all.

Table 1 summarizes accessibility features across the seven selected POS. Findings indicate that while most locations have paved pathways and seating areas, essential features such as ramps, tactile paving, and accessible restrooms are insufficient. Only Bindhyabasini Temple has an elevator for vertical mobility, while

none of the POS have tactile paving.

Table 1

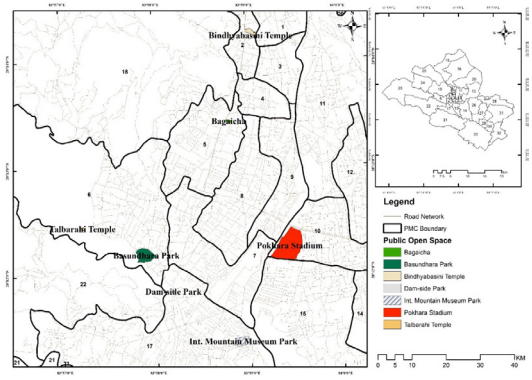
The Existing Stuation of Purposively Selected Study Area, PMC

Categories*	Basundhara Park	Parsyang Bagaicha Park	Bindhyabasini Temple	Dam-side Park	Int. Mt. Museum Park	Pokhara Stadium	Tal Barahi Temple
Ward no.	6	5	2	17	17	10	6
Area (sq.km.)	0.0590	0.0042	0.0135	0.0015	0.0334	0.1964	0.0026
Accessibility	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Compound	Yes	Yes	Yes	Yes	Yes	Yes	No
Security	Yes	Yes	Yes	No	Yes	Yes	No
Road	Yes	Yes	Yes	Yes	Yes	Yes	No
Parking	Yes	No	Yes	No	Yes	Yes	No
Light	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Landscape	Plain	Plain	Hill	Plain	Plain	Plain	Island
Drinking Water	No	Yes	Yes	No	Yes	Yes	Yes
Environment	Clean	Clean	Clean	Clean	Clean	Clean	Clean
Vegetation	Thick	Thin	Thin	Thin	Thick	Thick	Thin
Restroom	Yes	Yes	Yes	No	Yes	Yes	Yes
Benches	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Visitors	450	100	800	200	250	2700	350

Note. Adapted from Pokharel (2022). *Visitors Comprise All Categories of People.

Figure 5

Spatial Distribution of Public Open Space, PMC



Note. Topo Map, OSM Data, & Field Study, 2024

Table 2 illustrates the findings of the availability of accessibility in seven public spaces for people with visual impairment and physical disability in the purposively selected study area of PMC (Figure 5). The two types of disability viz. visual impairment and physical disability are focused. The observation was made on three category and nine sub-categories. The physical categories are meant for measuring the infrastructure. The four sub-categories (ramps, lifts, tactile paving and accessible restroom) are taken purposively that are to be in open spaces which are meant to increase the accessibility for visual impairment and physical disability. The ramp is mostly used to transit from one section to another. To be accessible for pedestrians with disabilities, ramps should be 180 cm wide in frequently stressed territories and have separated sections for longer ramps or height difference over 50 cm for resting. In areas that do not have large concentrations of people, ramps with a width of 90 cm are adequate, although the wider ones can be provided at turns (Erçin & Hindwan, 2023).

Table 2

Accessibility on Seven Public Spaces for Visual Impairment and Physical Disability

S.N.	Categories	Basundhara Park	Parsyang Bagaicha Park	Bindhyabasini Temple	Dam-side Park	Int. Mt. Museum Park	Pokhara Stadium	Tal Barahi Temple
A	Physical							
A1	Ramps	Yes*	Yes*	Yes*	No	Yes	Yes*	No
A2	Lift	No	No	YES	No	No	No	No
A3	Tactile Paving	No	No	No	No	No	No	No
A4	Accessible Restroom	No	Yes*	Yes*	No	Yes*	Yes*	No
B	Maintenance							
B1	Pathways	Yes*	Yes*	Yes*	Yes*	Yes*	Yes*	Yes*
B2	Seating Area	YES	YES	YES	YES	YES	YES	YES
B3	Vegetation	Yes	Yes	Yes	Yes	Yes	Yes	
C	Accessibility							
C1	Entrance	Yes*	Yes*	YES	Yes*	Yes*	YES	Boat
C2	Exist	Yes*	Yes*	YES	Yes*	Yes*	YES	Boat
C3	Medium	Road	Road	Road	Road	Road	Road	Road*

Note. [YES: Both (Visual Impairments & Physical Disability/wheelchair users), Yes*: Physical Disability/wheelchair users, Road*: Halfway]

DISCUSSION

Most of the study area doesn't require ramps except a few which are seen in Basundhara Park. Despite the fact, that, tactile pavement provides clear and obstruction-free walkaways for pedestrians with disabilities, in most of the sites it is absent. The pathways are paved with plain stones (Figure 7), making them suitable for wheelchair user excluding the concept of the existence of visually impaired people. If the site doesn't have more space for ramp construction, then there is a system of lift, especially making it beneficial for people with disabilities in situations of vertical mobility. Excluding six study sites, only the Bindhyabasini Temple has lift (Figure 6) as targeted for elderly people and PWDs. The concept of designing public restrooms by taking into account accessibility for people with disabilities is rare. It doesn't fulfill with the international standards for PWDs. In some sites, it lack restroom for even normal people.

In addition, maintenance categories examine the condition of infrastructure in public areas that are essential for people with disabilities. The pathways in most of the locations have been recently built, along with the seating areas. The vegetation sections seem to be well-kept in most areas, with native plants dominating the study area. In the case of Pokhara Stadium, due to extensive coverage, careful planning is necessary to enhance the aesthetic appeal of the public space. Lastly, prioritizing accessibility for PWDs is crucial for smooth connectivity in buildings and public areas (Arvanitis, 2004). The entrance and exit to open spaces are easily accessible in most areas for wheelchair users with the medium of transportation primarily being road connectivity. Even if, the road access connects all the POS, the situation is different for Tal Barahi temple, which is in the middle of the lake as an island. So, transportation to reach the destination involves the use of boats. However, pedestrians with visual impairments may encounter obstacles as the prerequisite tactile are not present in open spaces, though newly constructed.

Figure 6

Lift at Bindyabasini Temple

Figure 7

Pavement at Dameside Park

Figure 8

Ramp at Pokhara Stadium

Figure 9

Sitting area of Basundhara Park

Insights from Focus Group Discussions

PWDs reported frequent visits to POS but identified significant barriers:

- Uneven pavements and lack of tactile pathways hinder navigation for visually impaired users.
- Limited ramps and improperly designed restrooms reduce accessibility for wheelchair users.
- Safety concerns were raised, particularly in Dam Side Park and Tal Barahi Temple, where security measures were lacking.

Figure 10

Focus Group Discussions at Pokhara Stadium

Lack of policy awareness and ineffective enforcement of accessibility regulations affect POS. Seasonal variations influence usage, with fewer people in open spaces during monsoons to avoid additional challenges. Most open spaces within PMC accommodate wheelchair users, indicating a focus on physical disabilities. However, replacing standard stone paving with tactile pavement would benefit all, particularly those with visual impairments. Focus Group Discussions revealed that people with disabilities (visual impairments and wheelchair users) visit POS weekly. Many respondents cited uneven pavements and insufficient ramps as major barriers, highlighting inadequate design. Essential features such as tactile pathways, accessible toilets, and seating remain poorly implemented. While some improvements have been made, safety concerns persist. Despite polite interactions, respondents rated inclusivity in POS as low. Safety concerns were particularly noted at Dam-side Park and Tal Barahi Temple. Many respondents were unaware of policies addressing accessibility, and policymakers

have not sufficiently improved suitability. There is strong support for better accessibility at Pokhara Stadium (Figure 10). Beyond infrastructure, FGD indicated that user experiences remain suboptimal due to inadequate signage, seating, and security concerns. Implementing universal design principles can enhance mobility, autonomy, and social inclusion for people with disabilities.

CONCLUSION

This research study aims to evaluate the applicability of POS for visual impairments and wheelchair users (physical disability), selected based on two major disability in terms of population, focusing on identifying obstacles they encounter. Despite some attempts have been made to incorporate accessible elements like ramps, seating areas, and pathways, there is still a significant gap between the accessibility for physical disability (wheelchair users) and visual impairment. As per observation, the study areas are mostly located in the centre of the city, connecting it with the road network making accessibility friendlier but from the entrance, it is only partially adequate for wheelchair users; in the most scenarios with support of another person to direct the wheelchair excluding the concept of design for visual impairment as an essential element i.e. tactile paving has been missed in all the selected study area.

Overall, the study shows that although some advances are made in increasing the inclusiveness towards public spaces, further improvements are needed substantially. Here, there is a need to focus more on creating fully accessible and comprehensive tactile paving pathways, providing disability-friendly restrooms and increasing general maintenance of these facilities. By doing this, it will assist in making public open space a reality that will embrace everyone with different physical disabilities.

Despite progress in urban development, PMC's POS remain largely inaccessible to PWDs. This study highlights the urgent need for policy reforms and infrastructural upgrades, including:

1. Installing tactile pavements and ramps that meet international accessibility standards.
2. Ensuring universally accessible restrooms with grab bars, maneuvering space, and non-slip surfaces.
3. Enhancing security and maintenance in public spaces.
4. Involving PWDs in urban planning and decision-making processes.

Future research should expand the geographical scope and incorporate additional disability categories to provide a more comprehensive assessment. Addressing these issues will create inclusive public spaces that enhance the quality of life for all citizens.

AUTHOR CONTRIBUTIONS

Ramjee Prasad Pokharel Conceptualization; field visits for data acquisition and editing; preparation of maps using GIS software; original draft writing; data analysis; and manuscript editing.

Rajeev Upadhyay Software application and management; critical review; contribution to original draft writing; and editing of the manuscript.

Naresh Paudel Conceptualization; data acquisition; software application; and contribution to original draft writing.

Daya Sagar Subedi Data collection; software application; and map editing.

Sabitri Devi Regmi Software application; contribution to original draft writing; and manuscript editing.

Mishan Gurung Data collection; contribution to original draft writing; map creation using GIS software; and data analysis.

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