

Analysis of Pedestrian Accessibility for People with Disabilities on Adinegoro–Perintis Kemerdekaan Corridor, Medan City

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Abstract

This study analyzes pedestrian accessibility for people with disabilities along the Adinegoro–Perintis Kemerdekaan Corridor in Medan City. The research analyzes the condition of sidewalks along the corridor, which often do not meet accessibility standards. The problems identified include inconsistent sidewalk width, uneven surfaces, absence of guiding blocks, excessive slopes in transition areas, and the use of sidewalk space for parking and street vendors, all of which reduce pedestrian movement space. Inadequate orientation facilities and weak supervision in public space management further hinder the mobility of people with disabilities. This study combines perspectives from architecture, urban planning, and environmental management to produce practical technical recommendations. Inclusive infrastructure development is a national priority to ensure mobility rights, yet people with disabilities in Indonesia still face spatial discrimination due to the failure of universal design standards. In Medan City, the Adinegoro–Perintis Kemerdekaan Corridor is a strategic area connecting educational and transportation functions, but its accessibility remains highly inadequate. The main issues are sharp elevation differences and the absence of proper ramps, forcing wheelchair users to make dangerous maneuvers onto the roadway. This condition is worsened by parking areas, street vendors, trees, and irregular utility placement that interrupt accessible pedestrian circulation.

Keywords: inclusive infrastructure; pedestrian accessibility; people with disabilities; sidewalks; universal design

1. INTRODUCTION

Accessibility is a fundamental element in creating public spaces that are inclusive, safe, and equitable for all users, including for people with disabilities. In an urban context, pedestrian pathways not only serve as a means of mobility but also reflect the quality of the built environment in responding to the diverse needs of users. The principle of universal design emphasizes that pedestrian facilities must be usable independently, safely, comfortably, and without barriers by all segments of society, including wheelchair users, the visually impaired, the elderly, and those with limited mobility. This aligns with Law Number 8 of 2016 on People with Disabilities, which mandates the provision of accessibility and appropriate accommodations, as well as with the ratification of the Convention on the Rights of People with Disabilities (CRPD) through Law Number 19 of 2011. The World Health Organization (WHO) also emphasizes that inaccessible environments create barriers that limit the full participation of people with disabilities, while safe transportation and built environment design are crucial for supporting health, safety, and access to daily activities. The Central Statistics Agency (BPS), through its publication Portrait of People with Disabilities in Indonesia (2024), updated the picture of the conditions faced by people with disabilities in Indonesia, stating that accessibility issues remain relevant in public space planning.

These accessibility issues were also observed along the Adinegoro–Perintis Kemerdekaan Road Corridor in Medan City, particularly around the Foundation for the Advancement of Children with Disabilities (*Yayasan Pembinaan Anak Cacat* or YPAC), as illustrated in Figure 1. This area has a high level of activity and serves as one of the main routes used by people with disabilities, especially children and their caregivers who are active within the YPAC community. As an educational and rehabilitation institution for people with disabilities in North Sumatra, the presence of YPAC means this corridor should have safe and accessible pedestrian facilities. However, initial observations indicate numerous barriers that compromise the quality of pedestrian path accessibility, such as inconsistent sidewalk widths, damaged and uneven surfaces, the lack of ramps at elevation changes, discontinuous tactile paving, sidewalk slopes exceeding standards, and various obstacles such as illegal parking, street vendors, utilities in the middle of the path, and trees that reduce the

effective width of the sidewalk. These conditions indicate that a corridor that should support inclusive mobility is still not fully responsive to the needs of users with mobility limitations.



Figure 1. Mapping of the Adinegoro–Perintis Kemerdekaan Road Corridor

Inaccessible physical condition of sidewalks directly impacts users' comfort, safety, and independence. For wheelchair users, elevation changes without ramps pose a major obstacle, as they force them onto the roadway, which is more dangerous. For the visually impaired, interrupted tactile paving and obstacles on pedestrian paths make orientation and independent movement difficult. Meanwhile, for the elderly and general pedestrians, damaged or slippery sidewalk surfaces increase the risk of slipping and falling. Thus, public facilities that are supposed to be inclusive can instead become spaces of social exclusion when the quality of their infrastructure fails to meet accessibility principles. The conditions found at the study sites also do not align with technical guidelines for pedestrian pathways, which emphasize minimum sidewalk width, appropriate slope, non-slippery surfaces, guide markings for people with disabilities, and spaces free from obstructing activities.

Based on this, this study aims to analyze the level of accessibility of pedestrian pathways along the Adinegoro–Perintis Kemerdekaan Corridor based on the characteristics of people with disabilities and the principles of universal design. This study identifies physical and non-physical barriers that affect walkability, analyzes the continuity and connectivity of pedestrian facilities, and assesses the compliance of existing conditions with national accessibility standards. To achieve these objectives, the study employs triangulation through measured field observations, interviews with people with disabilities and the general public, and assessments using a Likert scale. The study's findings are expected to provide recommendations for the planning of pedestrian pathways that are more inclusive, safe, and compliant with accessibility standards for all users in the Adinegoro–Perintis Kemerdekaan Road Corridor area of Medan City.

2. THEORETICAL REVIEW

2.1. PEDESTRIAN ROUTE ACCESSIBILITY

Pedestrian route accessibility is defined as the degree to which a pedestrian space can be used safely, comfortably, smoothly, and equitably by all user groups, including people with disabilities. In an urban context, accessibility is not merely determined by the physical presence of sidewalks but also by users' ability to reach, traverse, and utilize such spaces without significant barriers. Law Number 8 of 2016 on People with Disabilities affirms that people with disabilities have the right to accessibility as part of ensuring equal opportunities in the use of public spaces. Accessible pedestrian paths are generally characterized by adequate width, a level and safe surface, the presence of ramps and tactile paving, and a minimum of physical barriers along the path. Furthermore, the Directorate General of Highways, through the Guidelines for Determining the Walkability Index, identifies pedestrian paths as a critical element in the urban transportation system that must be evaluated based on aspects of comfort, safety, and ease of use.

People with disabilities have different mobility needs depending on the nature of their disabilities and the characteristics of their activities. Therefore, public spaces designed to support this group must prioritize ease of movement, path continuity, safety, and the minimization of physical barriers. Government Regulation Number 42 of 2020 on Accessibility to Housing, Public Services, and Disaster Protection for People with Disabilities state that accessibility is a crucial component in ensuring equal rights and opportunities for an independent and prosperous life. In the context of pedestrian pathways, these mobility needs relate to the availability of sufficient space for wheelchair users, continuous tactile paving

for the visually impaired, and safe pathways for the elderly and users with other mobility limitations. Narrow, damaged, or physically obstructed pedestrian pathways can limit the mobility of disability communities and increase the risk of accidents while walking. From a technical perspective, this study also refers to Ministry of Public Works and Public Housing Regulation Number 14 of 2017 on Building Accessibility Requirements, which sets forth provisions regarding pedestrian paths, ramps, guiding blocks, and wheelchair maneuvering space.

2.2. WALKABILITY CONCEPT AND ASSESSMENT

Walkability is a concept used to evaluate the degree to which an urban environment supports walking as a mode of transportation. Rather than describing physical infrastructure, walkability assessment focuses on measurable parameters that determine the quality of the pedestrian experience. The Guideline for Determining the Walkability Index in Urban Areas outline a set of evaluation criteria, including the condition of pedestrian paths, crossing facilities, presence of obstacles, conflicts with other modes, environmental safety, and infrastructure for pedestrians with special needs. These parameters are used to calculate a walkability index that classifies pedestrian routes into categories ranging from highly walkable to unwalkable.

In this study, the assessment of walkability is centered on the specific mobility needs of users in the YPAC Medan area. Because these users have more demanding requirements than the general population, the evaluation criteria must be adjusted accordingly. The walkability index is not applied universally; instead, its assessment parameters are interpreted according to user characteristics such as wheelchair maneuvering space, tactile guidance continuity, and safe crossing points. This approach ensures that the assessment reflects real barriers faced by disability communities, rather than relying solely on generic physical checklists. The *Guidelines for Determining the Walkability Index* from the Directorate General of Highways serve as the primary methodological reference, but the assessment parameters are interpreted through the lens of inclusive design principles derived from Ministry of Public Works and Public Housing Regulation Number 14 of 2017 and other relevant standards.

Table 1. State of the Art

Author	Findings	Accessibility Criteria
Waluyo & Moerni (2025)	Brigjen Katamso Street corridor sidewalk face limitations that impact user comfort and walking experience	sidewalk condition, user comfort, walking experience
Tsaabitah & Siahaan (2024)	Accessibility policy implementation for people with disabilities in Medan City faces obstacles, especially in inclusive public facilities	provision of inclusive and disability-friendly public facilities
Hasbana et al. (2024)	Pedestrian facilities on Margonda Raya Street do not fully meet accessibility standards for disability communities, particularly ramps and physical obstacles	ramp condition, physical obstacles on sidewalks
Fajar et al. (2024)	Application of universal design principles to pedestrian paths improves mobility, safety, and comfort for all users, including people with disabilities.	universal design, mobility, safety, comfort
Fazrina (2021)	Pedestrian path around Lebak Bulus MRT Station is quite accessible but not yet fully optimal for various types of disabilities	accessibility for multiple disability types
Agustina (2024)	The principle of equality is essential for realizing an inclusive sustainable transportation system for disability communities	Equality, inclusivity in transportation

Based on the theoretical framework and the studies summarized in Table 1, the accessibility of pedestrian pathways in this study is understood as the result of the interaction between the physical quality of the space, the availability of supporting facilities, safety, comfort, and suitability for user characteristics. The reviewed research consistently indicates that while some pedestrian routes provide basic infrastructure, they often fall short of fully meeting the needs of disability communities, particularly regarding tactile paving, ramps, and the elimination of physical obstacles. Several studies also highlight the importance of applying universal design principles and ensuring equality in transportation planning to create truly inclusive pedestrian environments.

In the Adinegoro–Perintis Kemerdekaan corridor, where the primary focus is on users with disabilities (especially YPAC students), the analysis must go beyond assessing the mere presence of sidewalks. It must evaluate the extent to which these pathways can be effectively utilized by the target user group. Consequently, this synthesis positions walkability as a concept that is not universal but rather dependent on who the users of the space are, what barriers they face, and how they experience the available pedestrian routes. Therefore, field observations, Likert scale assessment, and interviews are employed as a unified method for interpreting both the objective conditions and the subjective experiences of users.

3. RESEARCH METHODOLOGY

3.1. RESEARCH APPROACH

This research employed a mixed-methods research approach that combines quantitative and qualitative methods to analyze pedestrian accessibility conditions along the Adinegoro–Perintis Kemerdekaan Corridor. Quantitative approach was used to measure the level of accessibility and respondents' perceptions through questionnaires and field measurements, while qualitative approach was used to explore users' experiences and identify barriers through field observations and semi-structured interviews (Artigues et al., 2020; King et al., 2020). Integration of these approaches enabled the study to compare objective physical conditions with users' subjective experiences through triangulation.

This research focused on pedestrian accessibility conditions for disability communities by evaluating the physical quality of sidewalks, the availability of accessibility facilities, physical barriers along pedestrian paths, safety, comfort, and compliance with universal design principles and national accessibility standards (Law Number 8 of 2016; Government Regulation Number 42 of 2020). This research was conducted along the Adinegoro–Perintis Kemerdekaan Corridor in Medan City, North Sumatra, with an approximate corridor length of 1.2 km. The corridor was selected because it is a strategic urban area with educational, office, and commercial activities, and is directly connected to the Medan Foundation for the Advancement of Children with Disabilities (YPAC Medan), which is actively used by people with disabilities.

To enable a systematic evaluation of pedestrian accessibility, the corridor was divided into three observation segments based on differences in pedestrian activity patterns and sidewalk characteristics. Segment A (0–400 m), located near the YPAC area, exhibits high pedestrian activity and is affected by the presence of street vendors and illegal parking, which often encroach upon pedestrian space. Segment B (400–900 m) is characterized by the prevalence of utility poles and open drainage channels along the sidewalk, creating physical barriers that reduce accessibility. Segment C (900–1,200 m) is distinguished by extensive vegetation and pavement damage caused by tree root intrusion, resulting in uneven walking surfaces that may pose challenges for pedestrians, especially those with mobility impairments.

3.2. DATA ANALYSIS TECHNIQUES

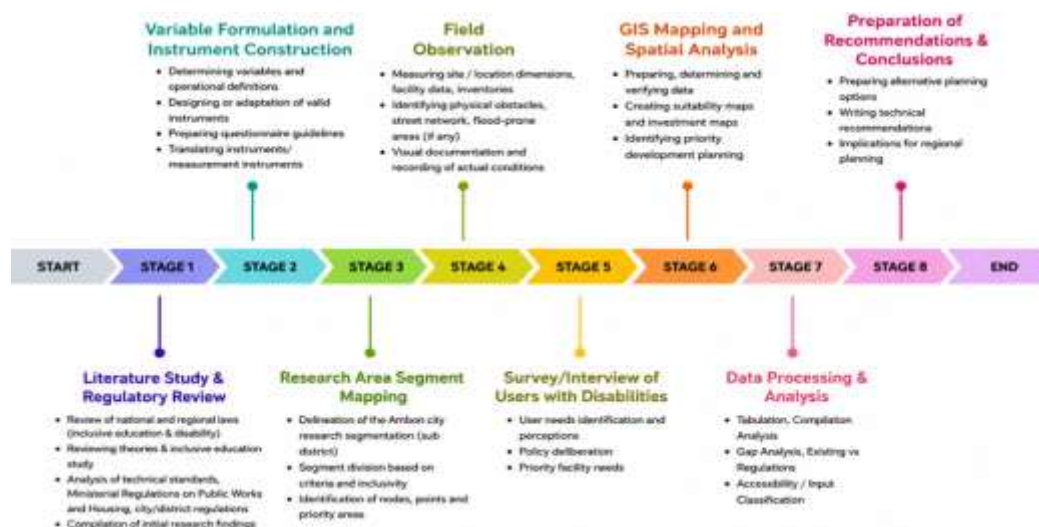


Figure 2. Research Flowchart

Data analysis in this study was conducted using quantitative and qualitative approaches. Quantitative analysis was used to process data from respondent questionnaires, while qualitative analysis was used to analyze data from observations and interviews. The results of the quantitative and qualitative analyses were then compared (triangulated) to determine the correspondence between the physical condition of the corridor, respondents' perceptions, and the level of accessibility perceived by users, particularly those with disabilities. The research evaluation referred to the principles of accessibility and universal design as the basis for assessing the extent to which the corridor meets the needs for safe, comfortable, and inclusive mobility. All stages of the research are presented in Figure 2.

For the record, the research implementation stages include location identification, literature review, instrument development, field data collection (observation, interviews, questionnaires), documentation, data analysis, triangulation of

findings, and conclusion drawing and recommendation development. This approach can be replicated by other researchers in different corridors or cities with similar characteristics.

3.3. DATA COLLECTION METHODS

The data collection methods used in this study were designed to obtain both primary and secondary data related to pedestrian accessibility conditions. Primary data were collected through field observations, semi-structured interviews, and questionnaires, while secondary data were obtained from literature reviews, regulations, technical standards, maps, and supporting documents (Odamé & Amoako-Sakyi, 2019).

Field observations were conducted to assess the physical condition of sidewalks and the availability of accessibility facilities along the study corridor. The assessment was based on Indonesian accessibility standards and universal design principles, covering sidewalk dimensions, surface conditions, ramps, tactile paving, physical barriers, pedestrian safety, accessibility continuity, drainage safety, and overall walkability. These observations were carried out at 20 measurement points distributed across the three corridor segments using measuring tools, documentation, and structured observation sheets based on Bina Marga Guideline (Highway Guideline) Number 07 Year 2024 and Ministry of and Public Housing Regulation Regulation Number 14 Year 2017.

Table 2. Data Collection Techniques

Data Type	Method	Instruments/Techniques	Subject/Data Source	Data Output
Primary Data	Field observation	The structured observation sheet contains a checklist of 25 items referring to Bina Marga and SNI standards, as well as measurements using a meter	1.2 km long sidewalk corridor with 20 measurement points	Physical condition of sidewalks, sidewalk width, pedestrian obstacles, and level of accessibility
Primary Data	Semi-structured interviews	Interview guidelines with a duration of 20–45 minutes per informant	15 informants: 2 wheelchair users; 2 blind people; 2 elderly people; 3 students; 2 office workers; 2 motorcycle taxi drivers; 1 security guard; and 1 street vendor	User perceptions and experiences of sidewalk accessibility
Primary Data	Questionnaire	10-point Likert scale questionnaire (1 = very bad/disagree, 10 = very good/agree)	20 selected respondents	Assessment of comfort, safety, accessibility, physical conditions, pedestrian obstacles, desire to use the sidewalk, and overall assessment
Secondary Data	Documentation and literature studies	Regulations, technical standards, scientific journals, photos and video documentation	Law Number 8 of 2016, Government Regulation Number 42 of 2020, Ministry of Public Work and Public Housing Regulation Regulation Number 14 of 2017, Ministry of Public Work and Public Housing Regulation Regulation Number 03 of 2014, Bina Marga Guideline Number 07 of 2024, SNI 8153:2015, related literature	Theoretical basis, evaluation standards, and documentation of sidewalk conditions

Semi-structured interviews were conducted to explore users’ experiences and perceptions of sidewalk accessibility. This method enabled respondents to describe their mobility challenges, needs, and expectations in greater detail than could be captured through structured questionnaire responses (Artigues et al., 2020). The questionnaire method was used to obtain quantitative assessments regarding pedestrian accessibility conditions using a 10-point Likert scale. The questionnaire focused on evaluating comfort, safety, sidewalk condition, physical obstacles, accessibility for people with disabilities, and willingness to use pedestrian facilities. The respondents in this study consisted of both people with disabilities and general pedestrians who actively use the corridor. Respondents included wheelchair users, visually impaired people, elderly users, students, office workers, motorcycle taxi drivers, street vendors, and local security guards. Details of the data collection techniques used in this study are presented in the Table 2.

3.4. DATA ANALYSIS TECHNIQUES

The data analysis process consisted of quantitative, qualitative, comparative, and triangulation analyses. Quantitative analysis was conducted using questionnaire data collected through a 10-point Likert scale. The mean score of each accessibility indicator was calculated to evaluate comfort, safety, sidewalk conditions, physical barriers, accessibility for people with disabilities, and willingness to use pedestrian facilities. Qualitative analysis was based on field observations and semi-structured interviews. Observation findings were analyzed descriptively to identify accessibility issues and physical barriers along the corridor, while interview data were analyzed thematically to understand users' experiences and mobility challenges.

A comparative analysis was performed by comparing the physical condition of sidewalks and accessibility facilities with relevant Indonesian accessibility regulations and universal design principles, including Law Number 8 of 2016, Government Regulation Number 42 of 2020, Ministry of Public Work and Public Housing Regulation Number 14 of 2017, Ministry of Public Work and Public Housing Regulation Number 03 of 2014, Bina Marga Guideline Number 7 of 2024, and SNI 8153:2015. Finally, a triangulation analysis was conducted by integrating observation, questionnaire, and interview findings to examine the consistency between physical conditions and users' perceptions of accessibility, thereby improving the validity and reliability of the study results (King et al., 2020).

3.5. RESEARCH LIMITATIONS

This study has several limitations. First, the number of questionnaire respondents was relatively limited and exploratory, so the results cannot fully represent all corridor users statistically. Second, the study focused primarily on physical accessibility conditions and user perceptions within a specific corridor area. Third, the assessment was conducted within a limited observation period, meaning that changes in pedestrian activity patterns during different seasons or special events were not fully captured. Therefore, future studies are recommended to involve larger samples, broader corridor coverage, and more detailed analysis focusing specifically on people with disabilities.

4. RESULTS AND DISCUSSION

4.1 PEDESTRIAN PATHWAYS ANALYSIS

The Adinegoro–Perintis Kemerdekaan Road Corridor is a secondary arterial road in the city of Medan, approximately 1.2 kilometers long. This corridor stretches from the intersection with Perintis Kemerdekaan Road on the north side to the area surrounding the State Islamic University of North Sumatra (UIN North Sumatra) on the south side. This area features a mixed-use land character, comprising an educational zone (YPAC Medan, Methodist High School 3, and State Vocational High School 11), an office zone (Medan District Attorney's Office and the Indonesian Journalists Association [PWI] Medan), and a commercial and service zone (retail stores, restaurants, and street vendors). This diversity of functions results in high pedestrian activity, particularly in the morning from 7:00 AM to 9:00 AM and in the afternoon from 3:00 PM to 5:00 PM. However, preliminary observations indicate that the majority of pedestrians prefer walking on the roadway rather than using the available sidewalks, suggesting a serious issue with the quality of pedestrian pathways.

Based on physical characteristics and activity density, the study corridor was divided into three segments to facilitate spatial analysis. Segment A (0–400 meters) is in the northernmost section, extending from the intersection of Perintis Kemerdekaan Street to the entrance of YPAC Medan. This segment has the highest level of activity due to the presence of street vendors, illegal parking, and the constant flow of vehicles entering and exiting YPAC and the surrounding shops. Segment B (400–900 meters) extends from the YPAC exit area to the Medan District Attorney's Office area. This segment features sidewalks directly adjacent to open drainage channels and several utility poles located within the pedestrian walkway area. Segment C (900–1,200 meters) is located in the southern part, specifically around the UIN Sumatera Utara campus and Taman Budaya Medan. This segment has fairly dense vegetation that is poorly maintained, causing tree roots to damage the sidewalk surface.

Field observations indicate that the physical condition of sidewalks along the corridor generally falls into the poor to very poor category. Sidewalk widths measured at 20 different points ranged from 95 cm to 125 cm, with an average of 110 cm. These conditions fall far below the minimum standards set in the Ministry of Public Guideline Number 07 of 2024, which stipulate a width of 150 cm for two-way pedestrian paths, and also fail to meet the requirements of Ministry of Public Works and Public Housing Regulation Number 14 of 2017, which sets a minimum width of 120 cm for

accessible pathways. This inadequate width prevents two pedestrians from comfortably passing each other, and wheelchair users do not have enough space to maneuver, turn, or pass other users.

The sidewalk surface also showed a significant decline in material quality. At nearly all observation points, cracks, potholes, poorly applied patches, and the growth of moss and grass were found. These conditions made the surface uneven and slippery, thereby increasing the risk of slipping or tripping for pedestrians. These findings align with the opinion of Cohen et al. (2020) who state that hazards on sidewalk surfaces, such as cracks, potholes, and unevenness, can increase the risk of falls among pedestrians in urban areas.

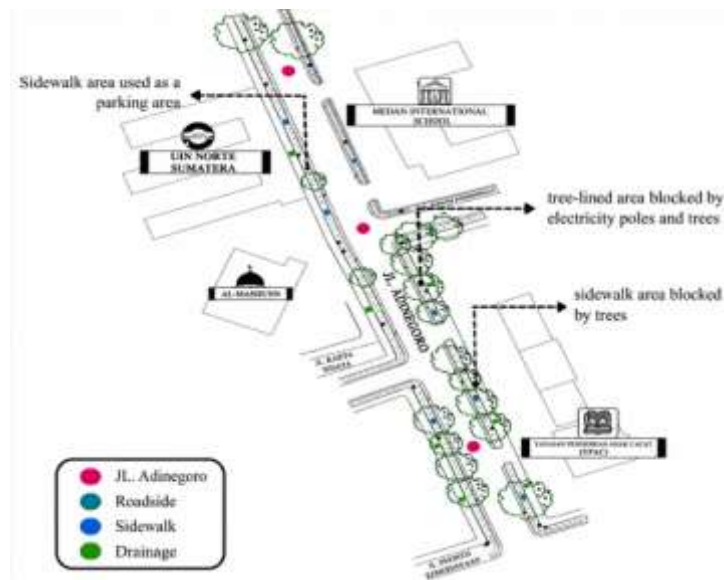


Figure 3. Spatial Distribution of Sidewalk Damage and Physical Barriers along the Adinegoro–Perintis Kemerdekaan Road Corridor

The physical barriers observed in the field were also quite diverse and scattered along the corridor. Permanent barriers included 27 shade trees planted in the middle of the sidewalk, 18 utility poles and telephone poles standing directly in the pedestrian path, and open drainage channels in Segment B that lacked covers or safety guards. Meanwhile, temporary obstacles include 12 illegal parking spots with an average of 2–3 vehicles at each spot using the sidewalk as a parking area, 8–10 street vendors selling on the sidewalk, particularly in Segment A, as well as piles of trash and construction materials at several locations. The coordinates of each obstacle have been recorded and displayed on the spatial distribution map in Figure 3.

The impact of these obstacles is significant. At certain points, the effective width of the sidewalk can narrow to just 30–50 cm, which is not even enough for a single adult to pass comfortably. As a result, pedestrians are forced to step onto the road—which is crowded with vehicles—to avoid these obstacles. This situation is corroborated by interviews with informants. A security guard in the area stated, “Rarely does anyone use the sidewalk; people have even fallen there.” A motorcycle taxi driver also confirmed, “The sidewalk is damaged; most people walk on the road.” Families of YPAC users even called this route dangerous and stated that guide paths and safety barriers are needed.

4.2 PEDESTRIAN ACCESSIBILITY ASSESSMENT

Accessibility features that are intended to support the mobility of the disability community are virtually nonexistent along this corridor. Guide paths or tactile paving are available only at very limited points—less than 5% of the corridor’s total length. Even there, they are interrupted by obstacles such as trees, utility poles, or parked vehicles. The color of the available guide blocks also lacks contrast with the surrounding sidewalk surface, making them difficult to recognize for users with visual impairments who still have residual vision. Ramps at points of elevation change are also completely absent along the corridor. When the sidewalk is interrupted at intersections or building entrances, there are no ramps to allow wheelchair users to safely ascend or descend. Elevation differences range from 5 cm to 15 cm, which poses a barrier to wheelchair users’ ability to move independently.

The lack of these accessibility features directly impacts the mobility of disability communities. For wheelchair users, narrow sidewalks, uneven surfaces, elevation changes without ramps, and open drainage channels limit independent

movement and increase the risk of slipping or falling into the channels. For people who are blind, the absence of continuous guide paths and the discontinuity of these paths reduce spatial orientation abilities and increase the risk of getting lost. For older adults and people with limited mobility, unstable surfaces and various physical barriers along the path increase the potential for falls, which can have serious consequences.

The respondents' assessment results indicate that pedestrian accessibility in the study corridor remains low and does not yet meet the needs of all users. The accessibility indicator for the disability community received an average score of 2.3 and falls into the "very poor" category. These results confirm that the sidewalks in this corridor are not yet accessible to the disability community, a finding further supported by field observations regarding the lack of guide paths, ramps, and other accessibility features. This score is also lower than the results of the study by Hasbana et al. (2024) on Margonda Raya Street, Depok, which received an average score of 4.5 on similar indicators. This indicates that conditions in Medan are more severe.

The physical condition of sidewalks also received a low rating, with an average score of 3.5, placing it in the "poor" category. These findings confirm that sidewalk widths are inadequate, surfaces are damaged, and various physical barriers hinder pedestrian movement. However, this score is still higher than that for accessibility for disability communities, indicating that respondents view disability accessibility as a far more critical issue. The willingness to use sidewalks received a score of only 4.2 and fell into the "poor" category, indicating that the public tends to be reluctant to use pedestrian paths due to their unsuitable conditions. This aligns with informants' statements that most pedestrians choose to walk on the roadway.

Interestingly, the barrier indicator received the highest score, 6.5, and falls into the high category. In the context of this questionnaire, a high score on the barrier indicator indicates that respondents are aware of the numerous barriers on the pedestrian path. Thus, a score of 6.5 indicates that the barriers in this corridor are classified as moderate to severe. This finding aligns with Osorio-García et al. (2023) who state that the presence of barriers on sidewalks can reduce comfort levels by up to 40%. Meanwhile, the comfort indicator received a score of 5.5 and the safety indicator 5.7, both falling into the moderate category. However, these figures must be interpreted with caution because most respondents were general pedestrians who may have become accustomed to poor conditions or have lower standards. For the disability community, the scores obtained were significantly lower.

Overall, these results indicate that accessibility in the study corridor is not yet optimal and still faces fundamental challenges. The low accessibility scores for the disability community and the poor physical condition of the sidewalks suggest that pedestrian pathways are not yet functioning as inclusive and safe public spaces for all users. The high level of physical barriers also underscores that accessibility quality in this corridor remains heavily influenced by physical obstructions that reduce the comfort, safety, and ease of pedestrian mobility.

4.2.1. Physical Condition of Sidewalks

Field observations indicate that the physical condition of sidewalks along the corridor generally falls into the poor to very poor category. The width of the sidewalks, measured at 20 different points, varies between 95 cm and 125 cm, with an average of 110 cm. This figure is far below the minimum standard set by the Ministry of Public Works and Public Housing Guidelines Number 07 of 2024, which requires 150 cm for two-way pedestrian paths, and also falls short of the standard in Ministry of Public Works and Public Housing Regulation Number 14 of 2017, which mandates a minimum width of 120 cm for accessible pathways. This inadequate width prevents two pedestrians from comfortably passing each other, and wheelchair users have absolutely no sufficient space to maneuver, let alone turn or pass other users.

The sidewalk surface also showed significant material degradation. At nearly all observation points, cracks, potholes, poorly applied patches, and the growth of moss and grass were found, as illustrated in Figure 4. These conditions caused the surface to become uneven and slippery, posing a high risk of pedestrians slipping or tripping. These findings align with Cohen et al. (2020) who explain that hazards on sidewalk surfaces, such as cracks, potholes, and unevenness, can increase the risk of falls among pedestrians in urban areas.



Figure 4. Existing Condition of the Pedestrian Path

4.2.2 Physical Obstacles on Pedestrian Paths

The physical barriers identified in the field are highly varied and scattered along the corridor. Permanent barriers include 27 shade trees planted in the middle of the sidewalk, 18 utility poles and telephone poles standing directly in the pedestrian path, and open drainage channels along Segment B that lack covers or safety barriers. Temporary obstacles include 12 illegal parking spots with an average of 2–3 vehicles per spot using the sidewalk as a parking area, 8–10 street vendors selling on the sidewalk, primarily in Segment A, as well as piles of trash and construction materials at several locations. Examples of these physical barriers are shown in Figure 5. The coordinates of each identified obstacle were recorded and displayed on a spatial distribution map in Figure 3.



Figure 5. Obstacles on the Pedestrian Path

The impact of these obstacles is significant. At points with obstacles, the effective width of the sidewalk can be reduced to as little as 30–50 cm, which is not even sufficient for a single adult pedestrian to pass through. Consequently, pedestrians are forced to step onto the road, which is crowded with vehicles, to avoid these obstacles. This situation is corroborated by interview results with informants. A security guard in the area stated, “Rarely does anyone use the sidewalk; people have even fallen there.” An ojek driver also confirmed, “The sidewalk is in ruins; people mostly walk on the road.” Families of YPAC users even described the path as dangerous, saying, “It’s dangerous to walk on the sidewalk; there should be guiding blocks and a fence.”

4.2.3 Accessibility Facilities for People with disabilities

Accessibility facilities that should support the mobility of disability communities are virtually nonexistent in this corridor. Tactile paving (guide paths) is found only at a very limited number of points (less than 5% of the total length of the corridor), and even then, it is discontinuous due to obstacles such as trees, utility poles, or parked vehicles. The color of the available guiding blocks also lacks contrast with the surrounding sidewalk surface, making them difficult to discern for visually impaired individuals with limited residual vision. Ramps (sloped pathways) at elevation changes are completely absent along the corridor. Whenever the sidewalk is interrupted at intersections or building entrances, no ramps are provided to allow wheelchair users to safely navigate up or down. Elevation differences range from 5 cm to 15 cm, which are obstacles that wheelchair users cannot navigate independently. Examples of the existing accessibility facilities and their conditions are shown in Figure 6.



(a) No tactile paving



(b) No barrier between the sidewalk and the drainage system



(c) Tactile paving is insufficient

Figure 6. Facilities for People with Disabilities

The absence of accessibility facilities has a direct impact on the mobility of people with disabilities. For wheelchair users, the limited sidewalk width, uneven surfaces, elevation differences without ramps, and the presence of open drainage channels restrict independent movement and increase the risk of slipping or falling into the drain. For blind users, the absence of a continuous guiding block and the discontinuity of the pathway reduce spatial orientation ability and increase the risk of losing direction or getting lost. For older adults and users with limited mobility, unstable surface conditions and physical obstacles along the path increase the potential for falls, which may be fatal.

4.3 ASSESSMENT RESULTS OF THE ACCESSIBILITY SCALE

4.3.1 Respondent Assessment Data

The assessment results indicate that pedestrian accessibility in the study corridor remains low and does not meet the needs of all users. The most prominent finding is accessibility for disability communities, which received an average score of 2.3, categorized as very poor. This result indicates that the sidewalks in the corridor are not yet accessible to disability communities, reinforced by observations regarding the absence of guiding blocks, ramps, and other accessibility facilities. This score is also lower than the findings of Hasbana et al. (2024) on Margonda Raya Street, Depok, which received an average score of 4.5 for a similar indicator, thus concluding that conditions in Medan are more severe. The assessment scores for each accessibility indicator are presented in Figure 7.

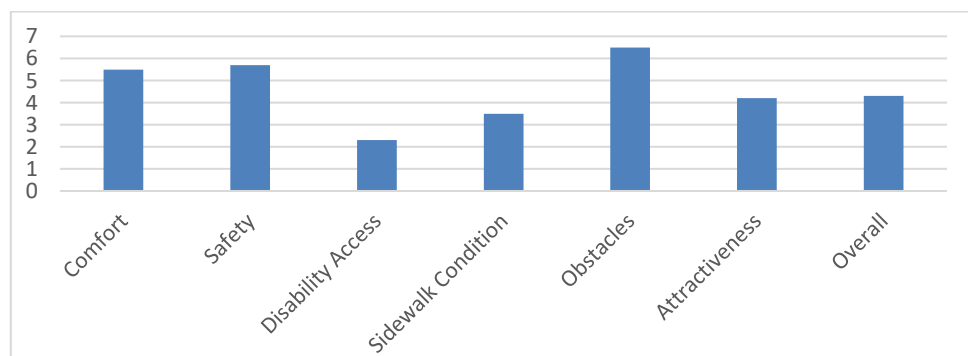


Figure 7. Accessibility Assessment Graph of the Pedestrian Path Based on Research Indicators

The physical condition of the sidewalks also received a low rating, with an average score of 3.5, categorized as poor. These findings confirm inadequate lane width, damaged surfaces, and various physical obstacles that impede pedestrian movement. However, this score is still better than accessibility for disability communities, indicating that respondents consider accessibility for disability communities a much more critical issue. Desire to use the sidewalks only reached a score of 4.2, categorized as poor, indicating that people tend to be reluctant to use the pedestrian paths due to their unsuitable condition. This aligns with informants' statements that most pedestrians prefer to walk on the road.

Interestingly, the obstacle indicator received the highest score, 6.5, in the high category. In the context of this questionnaire, a high score on the obstacle indicator indicates that respondents acknowledged the presence of numerous obstacles in the pedestrian path. Therefore, a score of 6.5 indicates that obstacles in this corridor are considered moderate to severe. This finding aligns with Osorio-García et al. (2023) who stated that the presence of obstacles on sidewalks can

reduce comfort levels by up to 40%. Meanwhile, the comfort indicator received a score of 5.5 and safety 5.7, both in the moderate category. However, these figures should be interpreted with caution, as most respondents who provided these ratings were general pedestrians who may have become accustomed to poor conditions or have lower standards. For disability communities, the scores were significantly lower.

4.3.2 Interpretation of Assessment Data

In general, the assessment results indicate that pedestrian accessibility in the study corridor is not yet optimal and still faces various fundamental issues. The low scores for accessibility for disability communities and the physical condition of the sidewalks indicate that the pedestrian path is not yet able to function as an inclusive and safe public space for all users. The presence of significant barriers also confirms that the quality of accessibility in this corridor is still significantly affected by physical obstructions that reduce the comfort, safety, and smooth mobility of pedestrians. Thus, these findings demonstrate that accessibility issues in the study corridor lie not only in the physical aspects of the sidewalks, but also in the lack of supporting facilities and the high level of spatial barriers. These conditions indicate that the pedestrian path in this area still requires significant improvements to meet accessibility principles for all users, especially people with disabilities.

4.4 ANALYSIS OF COMPLIANCE WITH STANDARDS AND THEORY

4.4.1 Compliance with National Accessibility Standards

In general, the condition of the pedestrian path along the Adinegoro–Perintis Kemerdekaan corridor still does not optimally meet national accessibility standards. Ministerial Regulation of the Ministry of Public Works and Public Housing (PUPR) Number 14 of 2017 stipulates that accessible pedestrian paths must have a minimum width of 120 cm, a safe, non-slip surface, and supporting facilities such as ramps and handrails. However, observations show that the average sidewalk width is only around 110 cm, the sidewalk surface is damaged and slippery, and adequate ramps are lacking at points of elevation difference. These conditions indicate that the existing pedestrian path does not fully comply with national accessibility standards.

A similar situation is observed with regard to barrier-free access. Ministerial Regulation of the Ministry of Public Works and Public Housing (PUPR) Number 03 of 2014 requires that pedestrian paths be barrier-free, have a stable surface, and be equipped with safety devices in potentially hazardous areas. However, various physical obstacles were still encountered in the study corridor, such as trees, utility poles, illegal parking, and open drainage without barriers. Thus, the pedestrian paths in this area do not adequately meet national accessibility standards, so it is necessary to rearrange the sidewalks, provide ramps at points of elevation difference, regulate physical obstacles, and protect areas that have the potential to endanger pedestrians.

4.4.2 Compliance with Universal Design Principles

In a review of universal design principles, the condition of the pedestrian path in the Adinegoro–Perintis Kemerdekaan corridor also does not demonstrate adequate implementation. Narrow sidewalks, uneven surfaces, the absence of ramps, and discontinuous guiding blocks mean that the pedestrian path cannot be used safely and independently by all user groups, especially disability communities. This condition shows that pedestrian spaces do not fully meet the principles of universal design, which require spaces to be used equally, safely, and comfortably by all users.

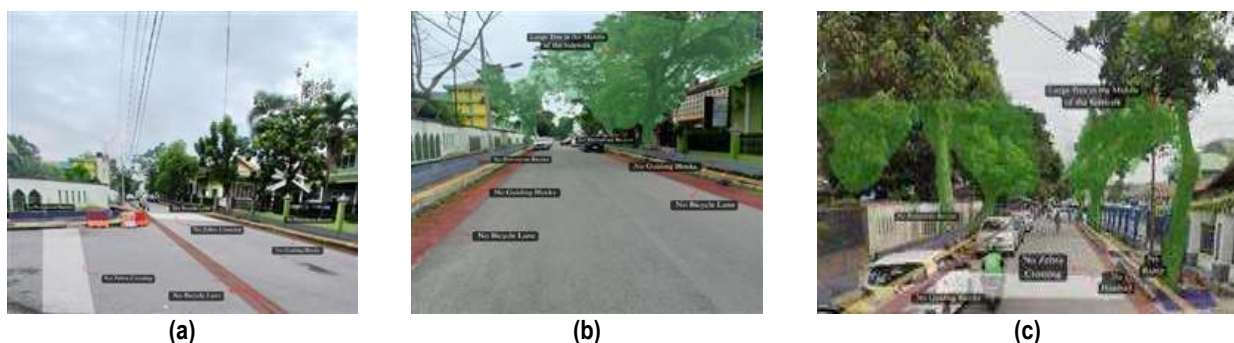


Figure 8. Existing Pedestrian Conditions That Do Not Meet Principles of Universal Design and Disability Accessibility

The principle of equitable use has not been achieved because pedestrian space cannot be utilized equally by all users. Furthermore, the principles of flexibility in use and low physical effort have not been optimally realized due to the presence of physical barriers that impede the mobility of wheelchair users, the elderly, and the visually impaired. Therefore, to make this corridor more aligned with universal design principles, continuous paths, stable surfaces, connected guiding blocks, ramps at every elevation difference, and the reduction of physical barriers that impede pedestrian movement are required. Thus, the Adinegoro–Perintis Kemerdekaan corridor still requires design strengthening to truly support inclusive accessibility for all users. The evaluation of the corridor based on universal design principles is presented in Figure 8.

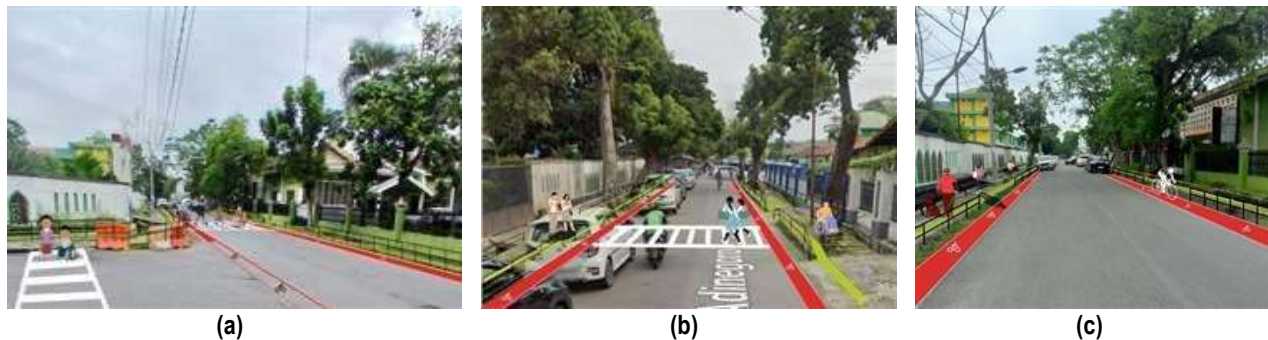


Figure 9. Illustration of the Proposed Arrangement of Pedestrian Accessibility and Disability Facilities on the Adinegoro–Perintis Kemerdekaan Corridor

Based on these issues, a proposed corridor redevelopment was formulated that focuses on improving pedestrian accessibility and applying universal design principles. This redevelopment focuses on providing safe, comfortable, and easily accessible paths for all user groups, including disability communities, the elderly, children, and cyclists. Redevelopment efforts are carried out through improving sidewalk quality, providing ramps at every elevation difference, installing continuous guiding blocks, and reducing physical obstacles that interfere with pedestrian movement. In addition, the redevelopment is also equipped with bicycle lanes, safer crossing areas, and dividing elements between vehicle lanes and pedestrian areas to improve road user safety. With this redevelopment, the Adinegoro–Perintis Kemerdekaan corridor is expected to create a more inclusive, friendly road space and support the mobility of all users equally. The proposed redevelopment concept for the corridor is presented in Figure 9.

4.5 COMPARISON WITH PREVIOUS STUDIES

4.5.1 Consistency with Findings from Other Studies

Sidewalk conditions on Brigjen Katamso Street, Medan, still have various limitations that affect pedestrian comfort (Waluyo & Moerni, 2025). The implementation of accessibility policies in Medan also continues to face several obstacles in practice Tsabitah & Siahaan (2024). Similar findings were identified on Margonda Raya Street, Depok, where physical barriers such as substandard ramps and sidewalk obstructions were still commonly found (Hasbana et al., 2024). In addition, pedestrian paths designed based on universal design principles are considered capable of improving mobility and safety, although their implementation in the field remains less than optimal (Fajar et al., 2024). Therefore, the findings of this study are generally consistent with various empirical studies in Indonesia, which indicate that pedestrian accessibility for disability communities still faces relatively similar challenges.

4.5.2 Differences and Uniqueness of This Study

While consistent with previous research, this study does demonstrate several differences and unique characteristics. Based on the research approach used, this study is the first to comprehensively map pedestrian accessibility conditions in the Adinegoro–Perintis Kemerdekaan corridor through triangulation: physical measurements, perception surveys, and in-depth interviews. Meanwhile, in terms of field findings, this study reveals a paradox: the existence of YPAC Medan as a disability service center is not directly proportional to the high level of accessibility in the surrounding area. In fact, Segment A, located around YPAC, is where the most obstacles were found, including illegal parking and street vendors blocking sidewalks. Furthermore, this study revealed a very low level of compliance with accessibility standards, with only 12% of the 25 standard items being met. This figure is significantly lower than the findings of Nugraha et al. (2023) in Dukuh Atas, Jakarta, which reported a compliance rate of around 35%.

4.5.3 Scientific Interpretation of Findings

According to the results of this study, the low accessibility in this corridor can be explained by several factors. First, there is a weakness in inter-agency coordination in the sidewalk planning and management process. Sidewalks are planned by the Public Works and Public Housing Agency, while oversight of parking and street vendor use falls under the authority of the Transportation Agency and the Public Order Agency (Satpol PP). Meanwhile, a lack of coordination between agencies has led to sidewalks that have been built to standards being occupied by other activities, disrupting their function. Second, weak law enforcement against accessibility violations has led to illegal parking on sidewalks and street vendor activity on them continuing without firm action. Third, the low level of public and stakeholder awareness regarding the rights of disability communities to accessible public spaces has exacerbated the situation. Many still view sidewalks as waste space that can be used for other purposes.

4.6 IMPLICATIONS OF THE FINDINGS

The condition of the pedestrian path along the Adinegoro–Perintis Kemerdekaan Street corridor significantly impacts the mobility of disability communities, particularly those using the YPAC Medan area. Inaccessible sidewalks, the absence of continuous guiding blocks, and the absence of ramps make it difficult for blind and wheelchair users to move safely and independently. These conditions indicate that the pedestrian space in the study area still does not support the principles of independence and inclusivity as mandated by Law Number 8 of 2016.

Based on the analysis, the area in front of YPAC in Segment A is a top priority for development due to its high level of barriers and the highest frequency of use by disability communities. Necessary interventions include removing obstacles on the sidewalk, providing guiding blocks and ramps according to standards, closing open drains, and improving the quality and width of the pedestrian path to support safer and more inclusive user mobility.

5. CONCLUSION

The study findings indicate that the pedestrian paths along the Adinegoro–Perintis Kemerdekaan corridor in Medan still do not meet national accessibility standards or the principles of universal design. Physical barriers such as inadequate sidewalk width, damaged surfaces, the absence of ramps and guiding blocks, as well as the presence of illegal parking, street vendors, trees, and utility poles prevent disability communities from using the pedestrian space safely and independently. Segment A in front of YPAC is the area with the highest level of barriers, indicating that the availability of disability services has not been accompanied by the provision of inclusive pedestrian infrastructure.

Based on the results of observations, interviews, and user assessments, the walkability level of the study corridor is still relatively low. This study shows that pedestrian accessibility issues are not merely technical but are also related to the management of public spaces and the implementation of urban accessibility policies. Therefore, improving the quality of pedestrian pathways is necessary through the removal of physical barriers, the provision of accessibility facilities in accordance with standards, and the sustainable application of universal design principles.

This study has several limitations that should be noted. First, the number of questionnaire respondents (n=20) is exploratory and not yet fully statistically representative; further research is recommended using a larger sample. Second, the use of a 10-point Likert scale aligns with the scoring system outlined in the Bina Marga Guideline Number 07 of 2024, which employs a 1–10 range, and was chosen to ensure consistency with the national evaluation standards in use. Third, this study does not include a sufficient analysis of the perceptions of users with disabilities specifically; therefore, further research focusing on this group is needed.

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