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**Assessment of Accessibility of Road Infrastructure Facilities for
Persons with Disabilities in Addis Ababa City**
(TERMINAL REPORT)

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ABSTRACT

The issue of accessibility of the built environment like roads for persons with disabilities is the one which has gained attention only in recent times. Inclusive road infrastructure system is a critical element in attaining urban accessibility among the Persons with Disabilities in developing countries like Ethiopia. The study's main objective was to assess the accessibility of road facilities for person with disabilities and identifies specific steps that can be taken to improve the situation in Addis Ababa City. The study covered Addis Ababa city major transport routes within the different sub cities, data were collected by purposive sampling technique from the association of the physically and visually impaired persons as a sample frame from sampled segments of road from each sub-city. Data was also collected from field survey on transport environments and through interviews with association of PwDs as well as key informants from different key institutions. The major causes of poor accessibilities as identified were lack of infrastructure provision, environmental barrier, absent of law enforcement, lack of public awareness and poor design of flow entities. The existing accessibility of road transport environment in each sub city of Addis Ababa is not accessible, the study identified that 40 road segments were selected in Addis Ababa city as a whole. The distribution by sub-city shows road segments in Kirkos (5 segments), Bole (5 segments), Arada (5 segments) , Yeka (3 segments), Lideta (3 segments), Nifas-Silk/Lafto (4 segments), Addis-Ketema (4 segments), Akaki (4 segments), Kolfe(4 segments) and Gullele (3 segments) sub-cities respectively. The Road accessibility elements identified in each sub-city indicates the presence, condition and/or dimension of pedestrian sidewalk, curb cut, zebra crossing, disability parking space, traffic control signals and tactile surface. PwDs have also faced different kinds of challenges among that the road infrastructure facilities related problems such as Bus stops related problems (Such as placement and parking condition), Barriers such as telephone poles, solid waste and pavements without curb ramps, Poor Road Condition such as Cracked and dangerous pavements were the top three with respective score with relative important index 0.76, 0.75 and 0.73. Finally, recommendation were made that road infrastructure should be accessible and policy framework should be revised and participatory.

Key Words: *Accessibility, Barriers, Inclusive Transportations, Public Transport, PwDs, Road Infrastructure*

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ACRONYMS

ADA	Americans with Disabilities Act
AU	African Union
CSA	Central Statistics Agency
CRPD	Convention on the Rights of Person with Disability
Co-I	Co Investigator
DDA	Disability Discrimination Act
ECMT	European Conference of Ministers of Transport
FDRE	Federal Democratic Republic of Ethiopia
GTP	Growth and Transformation Plan
ILO	International Labor Organization
MDGs	Millennium Development Goals
MoLSA	Ministry of Labor and Social Affairs
NPA	National Plan of Action
PwDs	Person with Disability
PI	Principal Investigator
RSDP	Road Sector Development Program
SEU	Social Exclusion Unit
UN	United Nation
UNDP	United Nation Development Program
WPA	World Program of Action
WHO	World Health Organization

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

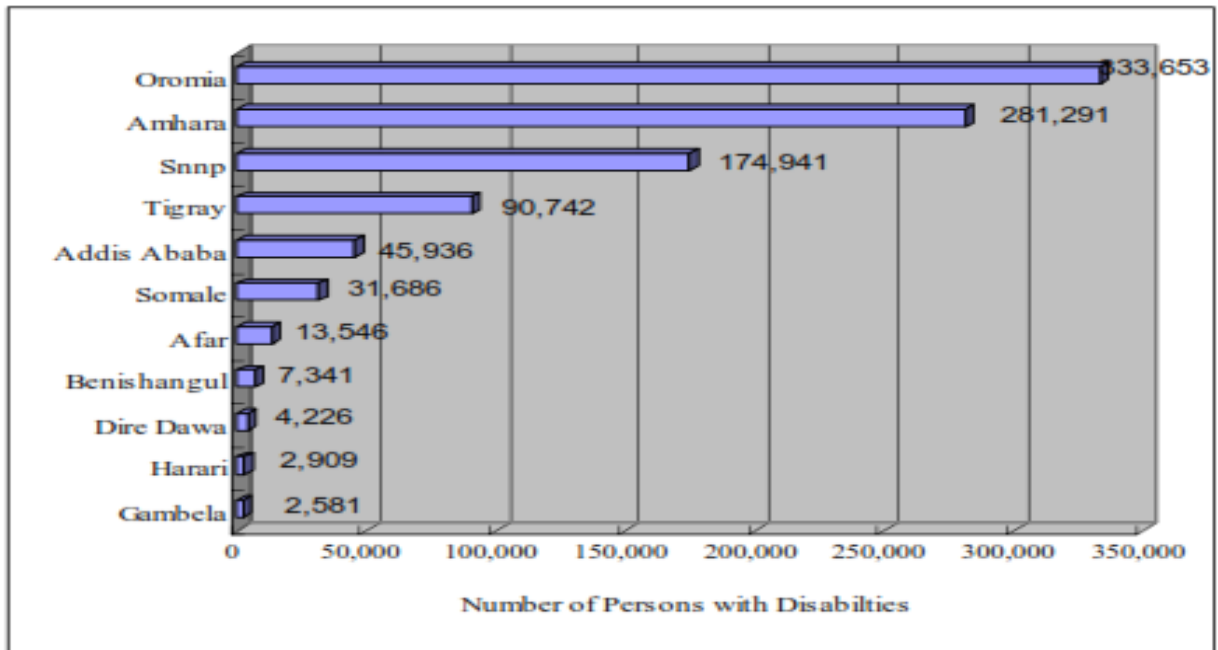
Transportation accessibility is a precondition for persons with disabilities to live independently and participate fully and equally in society. Now a day, persons with disabilities face different kinds of discriminations, posing difficulties and disadvantages of different sizes. Key amongst such challenges is the ability to access built infrastructure speciality road facilities. A challenge is exposed to planners and design professionals as to how they are able to improve accessibility of the built environment, specifically the transportation infrastructure system to help reduce the suffering of Persons with Disability (PwDs).

Globally there has been progress in reducing barriers in the transport environment for PwDs over the last four decades, particularly in the U.S. and some European countries in response to strong advocacy. The majority of low and middle income countries have disability policies, based on the United nations ,World Program of Action (WPA) and Standard Rules on equal opportunity, (Metts, 2000). But inclusive transportation hasn't given priority in planning & design.

With the annual growth rate of 1.14%, the world population now counts for more than 7 billion. Statistics show that the estimated 1 billion (approximately 15 %), out of the total number are persons with some form of disabilities (WHO, 2011). Although they are not homogeneous, this group of people belongs to the largest minority in the world. According to the (UNDP, 2010), report 80% of the world's PwDs live in developing countries belonging to the poorest group and now these numbers is rapidly increasing.

Based on the population growth in Ethiopia, it can be estimated that the national population in 2010 could increase to over 80 million people, of which nearly 1 million are PwDs (MoLSA, 2012).According to (BoLSA, 2012) the number of PwDs in Addis Ababa counts 18,076.According to Ethiopia's report on 2012 concerning the implementation of the UN Convention on the Rights of PwDs (CRPD), major challenges of PwDs in Ethiopia includes poor physical & technological accessibility that hinders independent mobility and adversely affect their overall inclusion in society. Ethiopia endorsed both the United Nation and African Union's decade of PwDs and as a response to these; MoLSA has enacted NPA to create favorable conditions for PwDs to enjoy full participation in family, community and national life. It also aimed to achieve the goal of creating a society inclusive of all (MoLSA, 2012). Thus, Ethiopia's legal system is not new to the concept of disability. However, transport accessibility the most important feature in realizing full participation in social and economic life of person with disability is unattended.

According to report drafted by a consultant (Wa'el International Business & Development Consultant, 2000), the country profile study on Persons with Disabilities, Ethiopia; the number of PwDs in each Regional State and City Administration is as follows.



Source: (Wa'el International Business and Development Consultants, 2000)

Figure 1.1: Number of Persons with Disability in each Region in 1994

Based on this survey report, the three most populous regions of the country; Oromia, Amhara and SNNP leads with high numbers of person with disability. From the urban city 85 percent of PwDs live in Addis Ababa city. Since Addis Ababa is the capital as well as the earlier city of the country, a large number of people under different categories of disabilities prefer and live in it. Despite this fact, inaccessibility of road infrastructure have been major challenges for persons with disabilities by making them to remain at home being denied of their rights to go to school, access health services and other services as equal as other citizens.

This research study is conducted to examine the accessibility of the road infrastructure facilities to PwDs. It employed open-ended questionnaires respondents and a survey checklist that required the views of actors that have an effect with addressing accessibility problems on key issues pertaining to PwDs. The findings from this study should enable all stakeholders concerned to come together to find ways to address this issue, especially policy framework and standard guidelines such as facilities to enable the PwDs to access them freely.

1.2 Statement of the problem

Today, at worldwide, challenges to public spaces and transportation systems stand out as the most solid physical exclusions for many persons with disabilities. Life is severely limited by barriers in the transportation environment. PwDs who are willing and able to work can't do so because of inadequate accessible transportation. Others can't shop, socialize, enjoy recreational and/or spiritual activities and even leave their homes for the same reason. Some individuals with disabilities must live in institutions solely because of constraints in the transportation environment which will enable them attend to medical appointments (Baris and Uslu, 2009).

Ethiopia, a developing country in Africa has an enormous numbers of the person with disabilities. According to (WHO, 2011) it is estimated that there are 8 Million persons with Disabilities in Ethiopia. Despite this fact, the road infrastructure facilities have been major challenges for persons with disabilities by making them to remain at home being denied of their rights to go to school, access health services and other services as equal as others citizens. Since Addis Ababa is the capital as well as the earlier city of the country, a large number of people under different categories prefer and live in it. Thus, there is great need to assess the challenges faced by persons with disabilities in transport environment and investigate the implementation status of policy framework/standard guidelines on the provision of road transportation facility access in Addis Ababa. Because the people of Addis Ababa who suffered a lot with casualty and fatality number are increasing from time to time, the issue raised needs consideration.

Moreover, the motivation for doing this research comes from the co-investigator one, having an injury due to a car accident during his childhood which has led him to disability even though it hasn't been very healing for him. As result, he engaged in addressing the gap related to highway engineering and thus, this research project is initiated by him to assess problems related to road accessibility.

Almost everyone might face temporary or permanent disability at some point in life; As a result, the road network facilities must take into account the needs and views for everyone and every person as they have to enjoy convenient, safe, and accessible-barrier free built environment.

1.3 Objectives

1.3.1 General objectives

To assess the physical accessibility of road infrastructure facilities for person with disability in Addis Ababa City.

1.3.2 Specific objectives

The study is intended to achieve the following specific objectives:

- To examine the existing accessibility of the physical road transport environment.
- To identify the most influential challenges experienced by Person with disability in accessing of road infrastructure facilities.
- To investigate the implementation status of policy framework/ standard guidelines that ensures the accessibility in light with PwDs.

1.4 Significance of the Study

The study will have numerous rationales. Foremost, it advocates for the assessment and taking action on the existing and/or future transport environment to be all inclusive. In doing so the study will provide road infrastructure facilities to focus on how to bring people and places together, by creating cities that focus on accessibility .It also serves as a tool for awareness creation about all inclusive environments.

Furthermore, in one or another way the study will be counted as one important tool of questioning the government in fulfilling the commitments it has made to people with disabilities through its ratification of international and regional transportation policy frameworks regarding accessibility for with PwDs. In addition, it is the researcher's belief that the study possibly will be taken as an input for further researches.

1.5 Scope of the Study

The scope is limited to issues related with accessibility of the transport environment mainly focus road infrastructure facilities. The research study is also limited on the study population of

person with disabilities (Physical and Visual impaired) as a highly challenged group with transport infrastructure facility.

The scope is further limited to the area of the city, Addis Ababa City since the city is a densely populated, largest and capital city of Ethiopia. The city has served as the major administrative, political, economic and diplomatic center. Thus, the study has only focused on the issue of accessibility for person with disability in using the road infrastructure facilities specifically, existing situation of accessibility challenges of road transport, the major causes for current transport environment problems related with person with disability, and finally based on the findings, to recommend possible solutions to improve the transport environments i.e. road infrastructure which is crucial for the accessibility of the person with disability.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter reviews literature that focuses on the subject matter by giving broad understanding of the topic. The literatures are reviewed in sections and are relevant to the wider objectives of

the research. Section 2.2 to 2.4 reviews the Issues of Disability, Urban Mobility concept and Transport Accessibility, Urbanization and Transport Development. Section 2.5 and 2.6 discusses Road Infrastructure and Transportation in Ethiopia & reviews the literature on the Policy and Legal frameworks of transportation at international, regional and national framework respectively. Sections 2.7 and 2.8, presents the experiences of some developed and undeveloped countries standards and Lesson learnt from Literature Review.

Accessible transport is about making transportation systems such as fixed facility and flow entities easier for all people to use. Everybody has limitations to their capabilities. If using transportation systems requires them to perform an action that they are not capable of doing, then that service is not suitable to them.

The European Conference of Ministers of Transport notes that “Accessibility is increasingly recognized as a key element of a high-quality, efficient and sustainable transport system. In fact all of us; as users of the transportation systems benefit from easier access to buses, trains, planes and ships. The economic benefits of better accessibility for transport operators and service providers are also becoming progressively clear (ECMT, 2006). Accessibility can be improved by removing the feature that creates a barrier for a particular group of people. It is necessary to consider the types of impairment or disability experienced by particular passengers, and the barriers that the system creates for people with those impairments. Such thinking supports the concept of universal or inclusive design, which is to make systems and products easy to use for as many people as possible.

Thus, accessibility is the ultimate objective of transportation systems. As a result transport planning and road infrastructure design should focus on how to bring people and places together, by creating cities that focus on accessibility, rather than simply increasing the length of urban transport infrastructure or increasing the movement of people or goods.

2.2 Definitions and Concepts of Disability

Disability is a form of impairment that has lived with mankind from the past, and/or will continue to be part of the society. Numerous people with disabilities do not have equal access to health care, education and employment opportunities. Disability-related services are not available to them, excluding them from everyday life activities.

Disability is part of human condition. According to Disability Discrimination Act 1995 (Her Majesty’s Government, 1995), “a person has a disability for the purposes of this Act if he has a

physical or mental impairment which has a substantial and long-term adverse effect on his ability to carry out normal day to-day activities.”WHO also defines disability “as any restriction or lack (resulting from impairment) of ability to accomplish an activity in the manner or within the range considered common for a human being”.

As of 2008, about 10% of the world’s population (650 million of which 200 million were children) were disabled, and this represented the world’s largest minority (Department of Economic and Social Affairs, United Nations, 2012). This is an indication that, the world will be counting billions of people with disability because disability increases through population growth. World Report on Disability 2011 confirms that, about a billion people are living with different forms of disability (World Health Organization, 2011).

Although there are several problems in dealing with issues related with PwDs in Ethiopia in general and in urban city in particular, the major problem relates to having comprehensive data regarding PwDs. Following the World Health Organization (WHO,1976)and International Labour Organization (ILO, 1990)definitions on disability, “Disability” is defined as follows in Ethiopia, by (Tirussew Tefera, 1991)

“A disabled person is any person unable to ensure by himself or herself a normal life, as a result of deficiency in his or her physical or mental capabilities”

According to the newspaper “Nagarit Gazeta”, the Emperor Haile Selassie I, in the Order No.70 of 1970, described the “disabled” as people who, because of limitations of normal physical or mental health, is unable to earn their livelihood and do not have anyone to support them; and shall include any persons who is unable to earn their livelihood because they are too young or too old.

In “Nagarit Gazeta” the Transitional Government of Ethiopia, Proclamation No. 101 of 1994 referred to “a disabled person” as a person who is unable to see, hear or speak or is suffering from mental retardation or from injuries that limit him or her due to natural or manmade causes; provided, however, that the term does not include persons who are alcoholic, drug addicts and those with psychological problems due to socially deviant behaviors.

According to (JICA, 2002), the state of persons with disabilities in Ethiopia is even more tragic and severe due to the presence of diversified pre and post-natal disabling factors (like infectious diseases, difficulties contingent to delivery, under-nutrition, malnutrition, harmful cultural

practices, lack of proper child care and management, civil war and periodic drought and famine) and the absence of early primary and secondary preventive actions.

Major current problems concerning disability are:

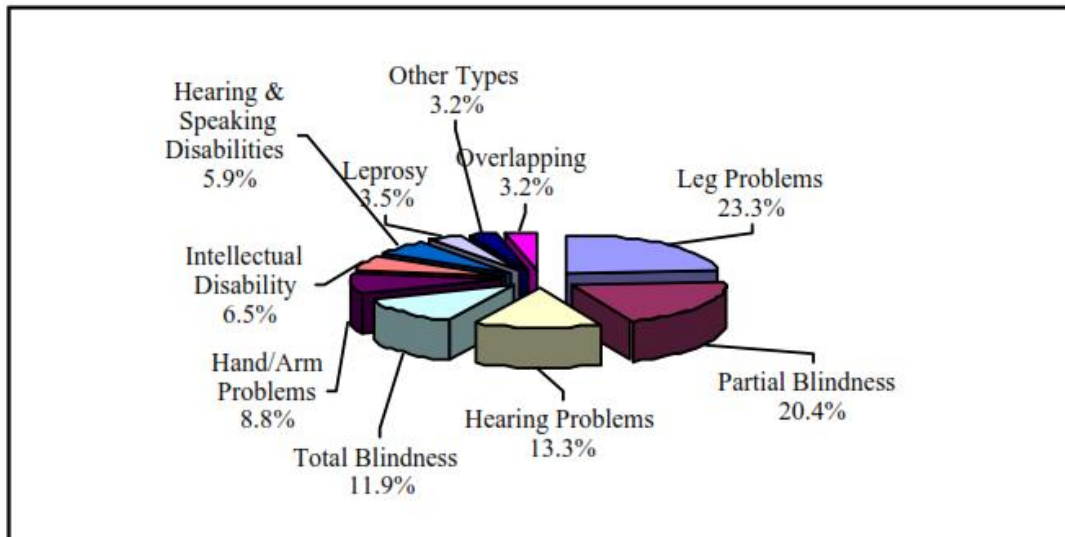
- ✓ Lack of public understanding
- ✓ Lack of information on the number and status of disabilities
- ✓ Shortage of basic needs, such as vocational training placement, health facilities etc.
- ✓ Inaccessibility to assistive devices

To alleviate the problems of disability the Ethiopian Federal Democratic Government has organized a Rehabilitation Department under the Ministry of Labor and Social Affairs(MOLSA). The main activities of the department are to realize rehabilitation, capacity building, and awareness rising. Government administration has been decentralized from the central to regional levels with structures extending from the zones to the “Woreda” districts. With respect to organizations, persons with disabilities have formed five associations and one federation to advocate their rights.

There are different indicators on disability in Ethiopia. Among that till today the following indicators data are identified during study of 1994.

- ✓ Disability-specific Data
- ✓ Age-specific Data

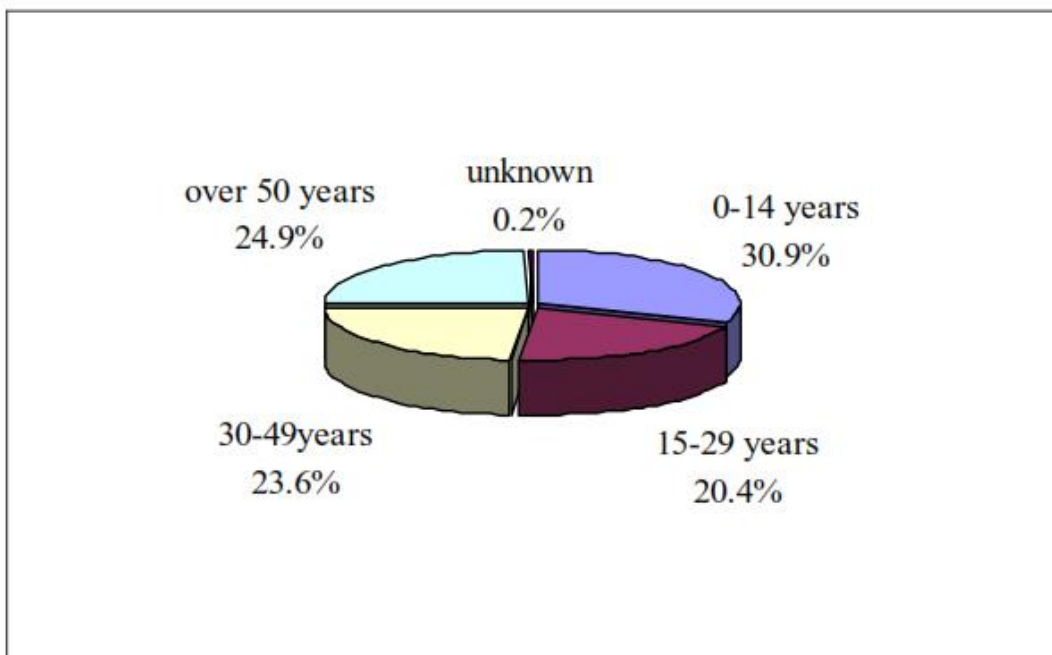
Disability-Specific Data



Source: (Wa'el International Business and Development Consultants, 2000)

Figure 2. 1: Types of Disability in Ethiopia in 1994

Age-Specific Data



Source: (Wa'el International Business and Development Consultants, 2000)

Figure 2. 2: Percentage of PwDs from total number within each age group in 1994

2.3 Concepts of Urban Mobility and Transportation Accessibility

Urban life in any society highly depends on the availability and suitability of transportation system. In any transportation, issues of access and mobility are important aspects so as to ensure improved living standards. In all aspects of urban life, be it in urban economy, shelter, or services transportation remains the key issue (Devas, 1993). Different transport technologies and infrastructure have been implemented resulting in a wide variety of urban transport systems around the world.

According to (Kunieda and Roberts, 2006) a successful strategy for accessibility and mobility problem of PwDs are the macro and micro strategies by stakeholder category. Macro strategies include mainstreaming equal access for all as a basic human right, through policies, legislation and programs supported by information and technology transfer. Micro strategies focus on service delivery at the local level, such as implementing universal design plans, better coordination and accessibility audits.

2.3.1 Urban Mobility Concepts

Mobility as ‘the capacity that a person has for getting around (Hillman et al ,1973) according to definitions (Tolley, R and B Turton ,1995), noted that mobility depends on personal factors such as health and financial resources and upon the range of transport facilities that are available. Hence mobility is individual and particular, and changes throughout a person’s lifetime, requiring different types of transport services.

In addition, (Misrak, 2006) states that, access is important to reach services such as education health and employment. Mobility and access are important to realize one’s potential in terms of learning, getting a job, entertainment etc. However, people with disabilities face barriers that inhibit them from enjoying the above mentioned important aspects of urban life.

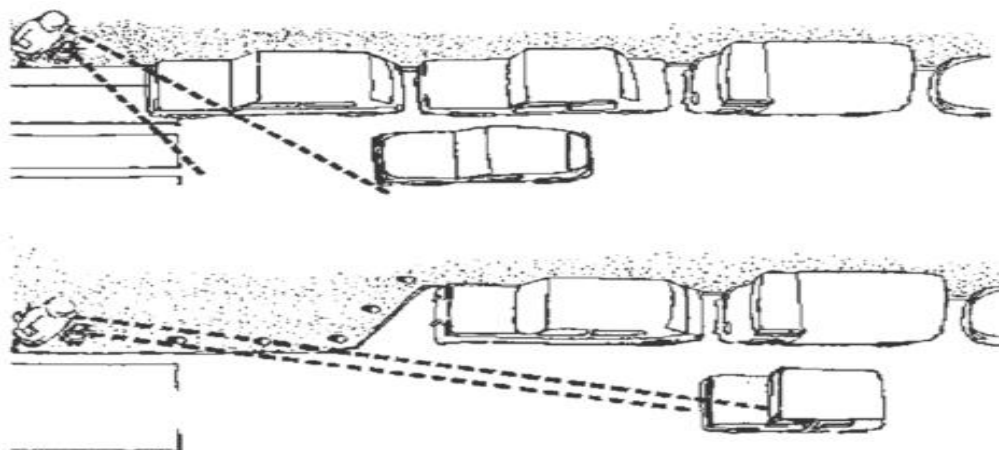
Thus, the consequences of individual transport rapid development are a threat for modern cities and their population. Actually, transport problems in urban areas mostly derive from inadequate solutions of urban mobility by local transport systems. According to, (Robert Marsanic, 2015) study reveals, majority of these problems is caused by extreme density of motor vehicles in urban areas. Increase of motor vehicles is a consequence of income increase and better standard of living, flow and speed of public transport are decreased due to cars, while construction of new transport infrastructures costs space and money, so the quality of life in cities is getting lower.

2.3.2 Transportation Accessibility

As (Kottenhoff, 2012), pointed out is because accessibility serves as “a mechanism to use something in any way, anytime and anywhere”. When it is seen from the view point of transport, it will appear to be capabilities to use transportation services whenever and wherever. Accessible public transport means having vehicles with design of low floor decks and its supportive facilities such as docking ramps. It is also suitability of the transport environment especially, for people with limited flexibility and mobility like PwDs.

On the other hand, (Rodrigues, 2009), discussed accessibility from the view point of the street environment. According to him, if streets such as highways, roads and interchanges are built targeting to be used by vehicles, they inhibit accessibility since they may not bear sufficient and comfortable sidewalks and other facilities for pedestrians, especially, for those with mobility problems. Therefore, a well-designed street environment and public transport system offer higher level of accessibility, which in turn play pivotal role on the mobility needs of PwDs.

Street crossings are important elements of the pedestrian environment. Person with Disabilities as a pedestrians are particularly vulnerable because they often move more slowly i.e. they are slower to perceive and react to danger than other pedestrians. Mitchell (2007b) has reviewed the safety of such pedestrians and the measures that can improve safety. PwDs pedestrians and all others pedestrians can benefit greatly from well-marked and well-designed crossings. The safety of a crossing can be significantly improved by extending the footway out across any parking lanes.



Source: (DPTAC, 1998)

Figure 2.3: Extending the Footway Out Across Parking Lanes at a Crossing

A significant development in transportation and public transport in particular, to achieve accessibility, is the move to "low-floor" vehicles. In a low-floor vehicle, access to part or the entire passenger cabin is unobstructed from one or more entrances by the presence of steps, enabling easier access for the infirm or people with push chairs. Sawyer and Bright (2007), discussed that the provision of appropriately designed, constructed and managed ramps is of importance to all users, but especially those using wheelchairs, pushing buggies or trolleys, and people using walking frames. The above idea is supported by figure 2.4 below.

Source: Tom Rickert, 2007



Figure 2.4: Low floor vehicle, minibus with a rear ramp and access by a ramp in the program.

According to the (World Bank, 2008), accessibility in design standards is manifested in a number of different ways, many of which are imperceptible to the general public. The following are some of the examples of public transport.

Nowadays, automobiles for persons with disabilities refer to ease of use; foot pedals can be raised, or replaced with hand-controlled devices. Wheelchair hoists, lifts or ramps may be customized according to the needs of the driver.

2.4 Urbanization and Transport Development

The origins of urbanization can be traced back to the Mesopotamia in the valleys of the Euphrates and Tigris Rivers; also it has been in existence for over 5000 years before Christ. Now, urbanization is one of the most remarkable issues of the twentieth century and a major challenge to scholars and policy makers; particularly in developing countries. This relate to the prevailing urban problems of housing, infrastructure, transportation, environmental sanitation and pollution, etc., that arise to a very high and sometimes unmanageable extent. (Ayeni, 2001)posited that, twentieth century was the time when almost all the world came to accept urban problems as a “normal” way of life.’

Regardless of this, views about urbanization have constantly been dynamic over the years. For instance, some portrayed cities as centers of great civilizations, job creation and for the promotion of good values and places for efficient and effective provision of services (UNCHS, 1996). In actual fact, city can be viewed as meeting point for people from diverse cultural, national and religious backgrounds; a place where people struggle for scarce economic resources as well as political stability or power.

Cities remain focal points of country’s economy where people come together primarily to exchange goods and interact. They are however, “drivers” of societal development; cities are usually places of dreams, wishes and imaginations. It should be noted that, the topography of urban settings for instance; Addis Ababa City, partly makes it an overcrowded and attractive location for societal mishaps.

Transportation development is considered as an indicator of level of urbanization. Transport creates a favorable condition for transaction, exchange, knowledge transfer and economic efficiency. On the other hand economic development and technological advancement enable nations to invest in transport improvements. Development in transport helps in creating strong ties between economic and social interaction leading to strong unity between people and further enhances good governance and addresses human right issues. However, the current transport service and infrastructure development not often addresses access to health and educational issues and it lacks consideration to the PwDs.

2.5 Road Infrastructure and Transportation in Ethiopia

Transportation in Ethiopia is overseen by the Ministry of Transport and Communications. According to the study on Urban Transport Planning by (MWUD, 2006); related with the level of urbanization and development, urban transport infrastructure and services are at rudimentary stage in Ethiopia. Modern urban transport systems are limited to few urban centers like Addis Ababa and only in the few capital cities of each region. In the majority part of Ethiopia, transport mode is fully pedestrian, and especially in the most rural areas using animals' backs or carts (donkeys, mules and horses) are used for the transportation of both goods and people. The study manual reveals, the road system is mostly asphalted in Addis Ababa and few secondary towns. The remaining vast majority of small and medium level urban centers have only pedestrian routes inaccessible by vehicles except for those parts lying on the national highway network system.

In most developing countries like Ethiopia road transport is one of the most popular and important modes of transport. In the case of Ethiopia, the physical and economic features as well as economic status of the population, make road transport the most viable mode of transport, the country must give priority to develop its socioeconomic infrastructure. At present Ethiopia has no option but to develop and improve the quality and accessibility of its road network (Asnake,2006).

Transportation is an extremely important issue for those people with disabilities. People with disabilities have consistently described how transportation barriers affect their lives in important ways. In a survey undertaken in 2004, inadequate transportation was a major problem for people with disabilities. Also, people with disability often experience isolation as a result of the poor physical accessibility of transport modes (SEU, 2003).

According to (Otak Inc., 1997) accessible roadway is often clearly absent and greatly needed for the cities in developing countries. Walking is the main mode of transport in many low-income countries, so some of the biggest infrastructure obstacles to accessibility are places where sidewalks, roads and road crossings are inaccessible or unsafe. Moreover, it hinder PwDs equal participation in society because of overwhelming environmental barriers, including inaccessible transport systems with poor infrastructure, vehicle design and information provision.

Accessibility of the PwDs and their movements are affected by various reasons such as:

- The location and distribution of uses and facilities,
- The physical design of places and pedestrian circulation systems such as: Zebra cross, roundabout, etc
- Choice in the means of transportation, including facilities for less mobile people such as non-car users,
- Information access and the ability of a place to accommodate the needs of people with a disability,
- The design of flow entities like design of public transport, Inaccessible signage and sign,
- Good Legislation and Poor Enforcement, and Environmental barriers to accessibility.

2.6 Accessibility of Infrastructure Facilities and Public Transport system

The concept of accessibility has become more highly appreciated; in fact it has become the most important goal for the development of transport as it fosters workforce mobility and increases capacity for meeting transportation needs. The starting point for research about accessibility is to find an answer to the question of whether regions that have favorable levels of accessibility are also the most developed regions. The improvement of the accessibility has a direct impact on quality of life by shortening travel time and therefore access to services; however, it still remains a question and unattended its impacts on Person with disabilities.

Problems related to Infrastructure facilities

The physical passages: lines, routes, conduits, tunnels through which mobile matter moves.

Terminals: service stations, spaces and the accompanying physical infrastructure where moving matter stop to load and/ or unload, make transit and get services.

Traffic signs: the physical structures placed in an urban transportation network to caution of or to prohibit the traffic from a certain (mobility) activity.

Curb ramps: are small but important parts of making sidewalks. Street crossings and the other pedestrian routes that make up the public right-of -way accessible to people with disabilities (FHWA, 1999).

Unfortunately, infrastructure for pedestrians with disabilities was not well developed. There is little provision for footpaths, footbridges, zebra crossings, and cycle tracks. Even where provided, the same are poorly designed, poorly maintained, and are not secure (Omwenga, 2011).

Good quality public transport can provide significant benefits for disabled people, who often face significant transport barriers to employment, in accessing employment opportunities (Beard, et al., 2013). Findings from a 2009 poll, again commissioned by disabled persons Transport Advisory Committee (DPTAC) showed clearly that disabled people are more dependent using buses approximately 20% more frequently than non-disabled people.

Access to local public transport is identified by the National Disability Authority (2007) as a key issue and incorporates consideration of the physical environment, including footpaths and other aspects of the route to and from the first point of use, type of vehicles, interchange facilities, information and customer care. “Experience in Ireland and elsewhere has shown that this is also the aspect of the public transport system which is hardest to ‘get right’. It requires the most attention from planners and operators, as well as the most operating funding” (National Disability Authority 2004(CIB, 2009).

The bus is the most common form of urban public transport in most parts of the world. The trend towards low floor buses in developed countries has transformed the accessibility of public transport. The pace of change has been rapid in many European cities. Additional accessibility features– such as color contrast to help people with low vision and grab handles for those unsteady on their feet – are not widely available in either developing or developed countries even though they are cheap and easy to install.

More costly facilities such as audible and visual ‘next stop’ information for those who are blind or deaf are available only in the major cities in some developed countries (Ann Frye, 2013). Accessibility of the disabled person or the movement of a disabled person is affected by various reasons such as:

- ✓ The location and distribution of uses and facilities,
- ✓ The physical design of places and pedestrian circulation systems such as: Zebra cross, roundabout,
- ✓ Choice in the means of transportation, including facilities for less mobile people such as non-car users, Information access and the ability of a place to accommodate the needs of people with a disability,
- ✓ The design of flow entities like design of public transport,
- ✓ Inaccessible signage and sign,
- ✓ Good Legislation and Poor Enforcement, and Environmental barriers to accessibility.

As we observe in Figure 2.5 below, there are construction materials, solid wastes and obstacles on sidewalks without any reservation; therefore it becomes a barrier for pedestrians especially for person with disabilities.



Figure 2. 5: Environmental Barrier to Accessibility

Source: Victoria Broadus, 2010.

According to (Tokuda, 2001), road transport barriers encountered by people with travel difficulty in Japan include; as we observe in Figure 2.6 below, parked on sidewalks were among the greatest inconveniences Photo (a). Cars parked on textured paving blocks are also major obstacles Photo (b). This is caused by drivers not realizing the significance of these blocks.



Figure 2. 6:Travel difficulty due to parking on sidewalks

Source: Victoria Broadus, 2010

2.7 Legal and Policy Frameworks

Now a day disability issues get legislative and policy frameworks to provide it special emphasis and global attention. The main purpose is to prevent person with disabilities exclusivity and discrimination from social, cultural and economic life. Although there are so many legal and policy frameworks at international, regional and national level, frameworks concerning accessibility, especially in the transport sector is not satisfactory. The principal objective of the legal and policy frameworks is to develop accessible, reliable, cost effective & safe road facility and public transport. In this topic the study focuses in digging out available frameworks dealing with accessibility in the international, regional, and national level.

2.7.1 International Frameworks

The UN Decade of Person with disability which was proclaimed for the years 1983 – 1992 can be cited as the first document to deal with PwDs (UN, 1982). The introduction of the decade triggered to raise disability issues and helped to foster the emergence of a global understanding of disability. The UN has made several wonderful human rights treaties. One of them is the UN Convention on the Rights of Persons with Disabilities (UNCRPD) that was adopted in March, 2007. The CRPD brings new momentum to reducing barriers in the transport environment and is an international benchmark and binding Human Right treaty. Governments must develop guidelines to make public facilities and services accessible (article 9). The CRPD applies to the urban and transport environment through its application of the following articles:

- i. Accessibility: Guiding principle of the CRPD (article 4) and relevant for all areas of implementation.
- ii. Physical environment: Measures should be undertaken to eliminate obstacles and barriers to indoor and outdoor facilities, including schools, medical facilities and workplaces (article 9 (1) (a))
- iii. Public facilities & buildings: Governments should set an example in ensuring full participation in society for persons with disabilities by developing guidelines to make public facilities and services accessible (article 9 (2) (a)).

The most important document next to world program of action is the 1993 UN Standard Rule on the Equalization of Opportunities for PwDs. This standard rules are based on the Social and Human Rights models of disability.

In the rules the social model sees the collective disadvantage of PwDs as being due to their society's inability to accommodate their varied needs, rather than as a problem of the individual. The human rights model can be seen from Article 12 of the rules that require States to recognize that PwDs enjoy legal capacity on an equal basis with others (UN Enable, 2007). The rule concerning accessibility specifies the following,

“ . . . States should initiate measures to remove the obstacles to participation in the physical environment. Such measures should be to develop standards and guidelines and to consider enacting legislation to ensure accessibility to various areas in society, such as housing, buildings, public transport services and other means of transportation, streets and other outdoor environment . . . “

The Millennium Development Goals (MDGs) can also be seen as policy document, although late to deal with the issue of accessibility. In the beginning, issues relating to PwDs in general and the issue of accessibility in particular were not mentioned in any of the 8 goals, 21 targets, or in the 60 indicators. However, the UN General Assembly so as to realize MDGs for PwDs adopted a resolution in 2008. The resolution was proposed by an expert group which was constituted under the supervision of the UN Secretariat for CRPD and the WHO.

In the final report of 2008, the group presented that addressing the profound social, cultural and economic disadvantage experienced by many PwDs and that promoting the progressive removal of barriers to their full and effective participation in all aspects of development will further the equalization of opportunities and contribute to the realization of a “society for all” in the 21,2008.

The report further discussed that ensuring accessibility play crucial role in making PwDs agents and beneficiaries of development by letting them to live independently and participate fully in all aspects of life (WHO, 2009).

Generally, Persons with disabilities have denied of their rights and were kept on the margins of society in many parts of the world. This continued discrimination against persons with disabilities highlighted the need to adopt a legally binding instrument which set out the legal obligations on states to promote and protect the disability rights.

2.7.2 Regional Frameworks

The experience of the UN Decade led to calls for a Decade of PwDs in various continents, including Africa for providing a local approach to the problems of disability and thus developing local solutions to the problems (AU, 2010). Based on this the African Decade of Persons with Disabilities was first proclaimed for the years 1999 – 2009, and further extended for the years 2010 – 2019. In respect of this the continental plan of action was prepared and on the issue of accessibility the plan on its objective states:

Promote and encourage positive attitudes towards children, youth, women and adults with disabilities, and the implementation of measures to ensure their access to rehabilitation, education, training and employment, as well as to cultural and sports activities and access to the physical environment (AU, 2010, Article 1.4).

Although the plan did not specifically deal transportation, it addressed the issue under Article 2.6 through discussing elements of social protection. One of the elements includes services and assistances with which transport service could be seen. The goal of the plan is to strive towards the full participation, equality and empowerment of PwDs in Africa. This plan of action is to be implemented by member countries of the African Union (AU). Ethiopia as one of the founding member tried to make the plan effective by adopting the national plan of action for people with disabilities.

However, making the continental plan effective may not be as easy as adopting the national action plan and this was seen with Ethiopia's report on the implementation of the Continental Plan of Action for the African Decade of PwDs (FDRE Report, 2012).

2.7.3 National Frameworks

Under this topic the researcher discusses the Ethiopian scenario regarding accessibility of the transport environment. Up to now there is no initiation towards regulating the transport environment from the view point of PwDs. Of course, the Ethiopian legal system is not new to the concept of disability and there were efforts to incorporate general disability issues beginning from the reign of Emperor Haile selassie I. However, transport accessibility the most important feature in realizing full participation in social and economic life of PwDs, was left vacant. Even though special regulation is absent, other frameworks may be used through interpretation. The following are some of them.

The FDRE Constitution under Article 41(5) considers support and rehabilitation for PwDs as the duty of the government. From this duty regulating for accessibility in transportation environment can be inferred. The other possible way may be related with Article 9(4) of the constitution. Under this Article, international conventions duly ratified by Ethiopia will constitute the law of the land, and to this effect since Ethiopia ratified the CRPD in 2010 matters relating to the transportation system in Ethiopia falls with the CRPD rules dealing with accessibility (Proclamation No 676/2010).

Ethiopia endorsed both the United Nation and African Union's Decade of Persons with Disabilities and being implementing member of the Plan of Actions concerning PwDs, it commits itself to the rules of making the 'environment free' so as to ensure the rights of equal participation. As a response to these commitments Ministry of Labour and Social Affairs (MoLSA) has enacted the National Plan of Action for Persons with Disabilities in 2012. This plan was aimed to create favorable conditions for PwDs to enjoy full participation in family, community and national life and it also aimed to achieve the goal of creating a society inclusive of all (MoLSA, 2012).

The Growth and Transformation Plan (GTP) is also appropriate to the issue at hand. It was intended to be implemented from 2010/11 through 2014/15, and it is currently in force. In its Social Welfare Section, objectives of the PRS regarding PwDs were enumerated. Among these objectives two of them are very close to the study focus, and these are promotion of the rights of PwDs to equal access and opportunities, and provision of assistive devices and proper rehabilitation (MoFED, 2010).

The other document pertaining to the study is the Policy that was enacted in 2011 by FDRE Ministry of Transport. This policy framework has objective that states, the policy is intended to provide safe, efficient, comfortable, affordable, reliable and accessible transport service for the inhabitants of the city. This policy issue identified inaccessibility as a challenge and it seeks to ensure accessibility in the transport environment. A strategy to be held to achieve this objective includes drawing guidelines of service provision (MoT, 2011).

2.8 Some Selected Country Experiences

Many countries have guidelines and standards for creating accessible transport systems. Guidelines and standards cover the different parts of transport systems such as the built environment, outdoor environment, different public transport systems and vehicles used, service and information. In this section experience of some selected Developed and Developing countries in legitimizing the issue of accessibility on their legal frameworks has discussed.

In the **United States of America** the issue of accessibility and mobility has been first regulated in 1973. This regulation was changed with a more detailed and specific regulation adopted in 1990 called the Americans with Disabilities Act (ADA). This Act has made transportation accessibility and accommodation to varied interest as qualified civil rights. It regulated public transportation service to be all inclusive without any discrimination of PwDs. This Act was to be implemented by the US Ministry of Justice until 2010. However, in order to better protect rights of PwDs in relation with transport accessibility the US Department of Transportation has been given the duty to implement parts of the Act dealing with accessibility.

Accessibility issue in the **United Kingdom** was first introduced in 1988 with the British government publication recommending specifications for local public transport services. In this publication local transport service should be easy for PwDs to use (Directgov, 2011) Based on this recommendation municipal legislation was made in 1989 which addressed the issue of accessibility of taxis in London. In 1995, the Disability Discrimination Act (DDA) set the general framework for accessibility legislation. The DDA was introduced to ensure rights of access to goods, facilities, services and premises which explicitly dealt with the issue of transport accessibility. In 2010 the DDA was superseded by the Equality Act which is more detailed in respect of transport accessibility including the street environment through consolidating different aspects of anti-discrimination law (Directgov, 2011).

In **India** accessibility issue was first formally introduced by the 1995, Persons with Disabilities Act. The Act introduced measures to encourage transport providers to take special measures, within the limits of their economic capacity and development, to adapt rail compartments, buses, vessels and aircrafts in such a way as to permit easy access to PwDs (Indian Government, 1995).

In addition, governments and local authorities should install auditory signals at red lights on public roads, have dropped curbs along footpaths for wheelchair users, mark the surface of zebra crossings, devise appropriate symbols of disability, and the like. Based on the Act the Rehabilitation Council of India produced a training aid to guide the development of barrier free environments in India and aid compliance with the legislation. This guide covered public transport, rail, sea and river transport and air travel; and set out guidelines it believes will provide a barrier free environment (Rehabilitation Council India, 2004).

Kenya ratified United Nations Convention on the rights of Persons with Disabilities (UNCRPD) on 19 May 2008. The Convention has also made provisions in relation to freedom of movement, liberty and independent living, which serves to demonstrate what needs to be done to ensure that persons with disabilities live in a barrier-free environment. It should be noted that the UNCRPD forms part of the municipal laws of Kenya due to the provisions of Article 2 (6) of the Constitution of Kenya that automatically domesticates all international treaties and conventions to which Kenya is a signatory.

The **Constitution of Kenya** (2010), Article 54. (1) On the specific right to persons with disability, the constitution states that a person with any disability is entitled Item (c) is of most interest to this study. This means the right to reasonable access to all places, public transport and information is fundamental and the state have the responsibility to provide the same. Further, Article 54 (2) states that, "the State shall ensure the progressive implementation of the principle that at least five percent of the members of the public in elective and appointive bodies are persons with disabilities". In addition, Article 81 (c) calls for fair representation of persons with disabilities in all organs of governance

2.9 Lesson Learnt from Literature Review

The literature review has revised the definitions, concepts of disabilities and different country experiences to develop the knowledge about transportation system, accessible transportation, and policies frameworks and standard guidelines related to PwDs.

Transportation system is a system consisting of the fixed facilities, the flow entities and the control system that permits people and goods to overcome the friction of geographical space efficiently in order to participate in a timely manner in some desired activity. The efficiency of the system is depend on the accessibility of infrastructure, the accessibility of flow entities such as automobile, pedestrian, cycle and wheelchair, with appropriate services imposing inclusive program.

The issue of transport accessibility as discussed from different countries perspective is seen as a cross cutting issue and being regulated in specific way. In fact, the presence of legal frameworks by itself does not necessarily guarantee the observance of rights of access of PwDs. As Venter et al (2002) suggested those frameworks should be backed by detailed regulatory frameworks. Some developing countries have implemented regulation and design guidelines which explicitly consider accessibility for people with disabilities. For Example, an ISO standard has been developed; built environment, symbols and wheelchairs standards. But in developing countries like Ethiopia the accessibility guiding principles especially for road infrastructure facility have not be applied because this designs for persons with disabilities is not institutionalized.

Guidelines regarding outdoor environments often include measures for space and width for wheelchair users, appropriate non slippery firm surfaces, maximum gradients on ramps and curb stones, design of handrails, and visual and tactile markings for persons with impaired vision. In some countries appropriate designs for pedestrian crossings, including light poles and guiding technology for visually impaired persons, are included in standard street and road design documents.

Ethiopia Minister of Transport mentioned policy issue focuses on the social environment relating to PwDs & have dealt in line with vulnerable groups such as children, women and the elderly. Although it did not give special emphasis to PwDs, it identified inaccessibility as a challenge and it seeks to ensure accessibility in the transport environment. A strategy to be held to achieve this objective includes drawing guidelines of service provision (MoT, 2011).

In Ethiopia, particularly in capital city Addis Ababa , there is clear gap in taking the measures so as to make the physical environment accessible including developing, publicize and monitoring the implementation of minimum standards and guidelines for accessibility.

As Venter (2002), pointed out since issues relating to accessibility are more or less similar across the world, it will be good to adopt the approaches, good practices and policy and legal frameworks of the developed world to countries of the developing world.

There are various researches related to transport system challenges and policies related with PwDs. But there is a gap of research in identifying the challenges experienced by people with disabilities in accessing road transport facilities and identifies specific steps that can be taken to improve the situation like policy implementation and enacting of accessibility guidelines. Therefore the study is interested to fill this all gaps.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents and describes the approaches and techniques the researcher has used to collect data and investigate the research problems, which includes the research design, study population, sample and sampling, study variables, data collection methods and instruments, data processing and analysis.

3.2 Study Area

The study was conducted in the 10 sub-cities of Addis Ababa. The study comprises the investigation of the conditions of road facilities in each sub-city which would be used to meet the research objectives.

The study area selected specifically to capture the diverse range of challenges faced by persons with disabilities in accessing road infrastructure facilities focusing at different sections of the city. This being the largest city in Ethiopia, the challenges can be assumed to represent the challenges faced by all PwDs in urban areas in the country and a proper policy for the country developed to address road transport access in urban areas in Ethiopia.



Source: Adapted from Addis Ababa City Administration, 2010

Figure 3.1:

Figure 3. 1 Study Area

3.3 Research Design

The research method used for this study involves a logical plan of activities and process of research that has addressed credibility of the study findings. Therefore, descriptive research design was used to meet the research objective and the research approach, data collection and analysis methods were also included.

The study employed both qualitative and quantitative research approaches, which enable the researcher to collect both qualitative and quantitative data. The qualitative approach is important for collecting the attitude and experience of the respondents about the facilities of transport environment for them and related issues, whereas the quantitative approach is important for obtaining numerical data by using a questionnaire, interview and observation so that these has enabled the study to generate statistics through the use of survey research

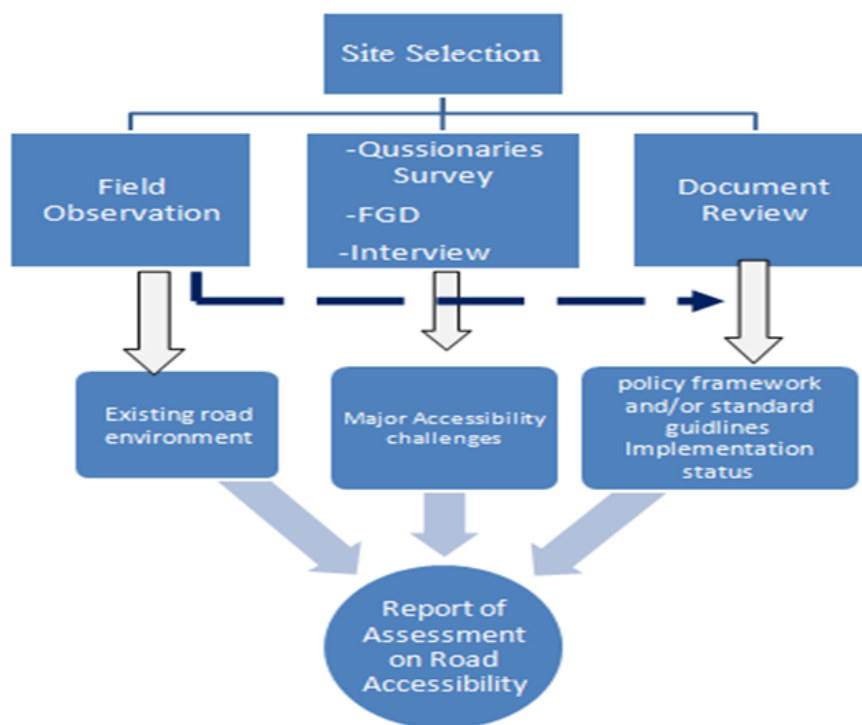


Figure 3. 2 Study Design Flow Chart

3.4 Study Population, Sample and Sampling

3.4.1 Target population

The study area of this research is Addis Ababa city. The city has sub-population of the entire mass of observations, which is the parent group from which a sample is to be formed. In the case of this study, the survey is going to counts segments of road in Addis Ababa sub city. Generally, for assessing the road facility for PwDs and mitigation mechanism of it, the population of the study has a composed of ten (10) sub cities those who are found in Addis Ababa.

As a general concept sampling is the way in which we select a sample of individuals to research participants. The method of sampling adopted for this research among probabilistic random sampling is Stratified Random Sampling. According to (Alvi.M, 2016), this type of sampling method is used when population is heterogeneous; means every element of population does not match all the characteristics of the predefined criteria. Instead the elements differ from one another on a characteristic and the respondents those are participated in questionnaire survey were selected depending on purposively targeted with the view that they could provide relevant information in relation to the research question. The sample of road segment selection to obtain a sample segments covering a variety of study variables by using the convenience sampling technique, from a total of population the following segments are selected.

Table 3. 1: The total number of segments in Addis Ababa sub-city

S,no	Sub-city	Number of segments
1	Akaki kalty	25
2	Nifas silk lafto	31
3	Kolfe Keranyo	29
4	Gulele	24
5	Kirkos	55
6	Lideta	17
7	Arada	33
8	Addis Ketema	22
9	Yeka	18
10	Bole	22
Total		276

Source: Addis Ababa Transport authority

The following samples are selected from the above population, which is 40 samples from 276 populations, that is more than 10%, which can be represented. The samples are also selected using stratified technique.

Table 3. 2: Study Sample and population from the study area

S.N	Sub-city	No segment	Origin-Destination
1	Nifas Silk Lafto	4	1. Jamo 1-Mekanisa 2. Jamo 1- Mebra 3. Kera Adebabyi- Sarbet Adebabay 4. Mebrat –German Adebaby
2	Kirkos	5	1. Stadiim - Ambassador Sinima 2. Stadiim- Meksiko Adebaby 3. Meskel Adebabyi- Urael 4. Meskel Adebabyi- Dambel 5. Meskel Adebabyi- Global
3	Addis Ketema	4	1. Gojjam Berenda- Yohannes Church 2. Gojjam Berenda- Mesalemya 3. Autobis Tera- Abinat 4. Medhanealem Adebabyi - Mesalemya
4	Gulale	3	1. Addisu Gebeya- General Winget 2. Addisu Gebeya - Dil bari 3. Addisu Gebeya - Chilot Adebabyi
5	Areda	5	1. Atakilt tera - Teklahymanot Adebaby 2. 4 kilo Adebabyi - Minilik Adebabyi 3. 4 kilo Adebabyi- England Embassy 4. 4 Kilo Adebabyi -6 kilo University 5. AbunaPetros Adebabyi- Sebera babur(gedam sefer)
6	Yeka	3	1. Megenegna -22 Global 2. Diyasbora Adebabyi- England Embassy 3. Metababer hintsa- Signal
7	Bole	5	1. Bole Airport - Bole Mikael 2. Bole Airport – Ruwanda 3. Bole Medhanealem- Urael 4. Dembal Adebabyi - Bole ruwanda 5. 22 Adebabyi- Medhanealem Adebabyi(Ednamol)
8	Lidata	3	1. Lidata Adebabyi- Torhayloch Adebabyi 2. Lidata Adebabyi- Meksiko Adebabyi 3. Lidata Adebabyi- Abinat Adebabyi
9	Kolfe keranyo	4	1. Keranyo Adebabyi- Yeshe Debele 2. Betel Adebabyi- Keranyo Adebabyi 3. Mendida Adebabyi- Torhayloch Adebabay 4. Ayeri tena Adebabyi - Torhayloch Adebabay
10	Akaki Kality	4	1. Saris Abo- Adey Ababa Adebabyi 2. Meseltenga - Adey Ababa 3. Meseltegna- Saris Abo 4. Meseltegna- Kality menehrya

3.5 Data Collection Techniques

Purposive sampling technique is also applicable to select participants who are considered to be difficult to reach (Kruger and Neuman, 2006). Because of the difficulty to find persons with disabilities collectively the study purposefully used Association of the physically and visually impaired persons as a sample frame from which both sexes of PwDs were inquired. According to the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), report, Addis; based on the report from Association of Persons with Disability in Addis Ababa City, about 5.2% city residents experience some form of disability, which is about 11,452 PwDs. The data was collected from the road segments by interview and questionnaires as well as the documents through the following private and institutions.

Table 3. 3:Name and Types of Public and Private Institutions interviewed

S/No.	Name of Institutions	Reasons for selection/ issues for interview
1	A.A Municipality & AACRA office	Design and Construction of Accessible urban transport infrastructure relies in this office and responsible for the provision and management of urban roads.
2	Addis Ababa Road and Transport Management Agency (AARTMA)	Transport policy issues dealing with Persons with Disabilities are domicile & This Agency responsible for the development of standards for design of vehicle bodies.
3	Interview & FGD for Persons with Disability	Their active participation in implementation plan about policy framework and accessibility issues

3.5.1 Field Survey

Field surveys of road environment in the study area were done at different sites in the ten (10) sub cities those who are found in Addis Ababa. The field survey was conducted in order to acquire information where and how the PwDs suffered to access road transport infrastructures facilities. A digital camera was used to take relevant pictures at strategic locations to show involvement and with due regard to the ethical considerations of this research. Field notes have also used to document relevant cases on field to avoid loss of valuable field experience. The checklist is included in result and discussion as well as in Appendix 1.

3.5.2 The Questionnaire Design

A questionnaire was developed to assess the views of visual impaired and physically impaired persons on the accessibility of infrastructure facilities for PwDs. The Causes and challenges of road infrastructure system problems for PwDs were first examined and identified through relevant literature reviews and then based on the questionnaire data, the view of visual and physically impaired were analyzed. Finally, possible measures to minimize the problem were assessed. The questionnaire for the study includes two forms based on specific objectives of the study. General information of the respondents such as age, sex, type or nature of disability, employment and education status were prepared.

Existing accessibility challenges in road infrastructure, Major causes and/or factors contributing to poor road infrastructure System and road infrastructure policy implementations for PwDs and Measures taken to minimize problems related to person with disability. Above all, respondents have asked to make their intention known about the use of road infrastructure in future if accessibility & mobility issues are to be improved. It has the advantage to cover a large population easily and quickly. Both open and close-ended questionnaires were developed and distributed to the sample individuals.

3.5.3 Interviews

In-depth interviews were conducted with representatives of institutions directly relevant to the study such as representatives of road authorities, transport sector & PwDs. This was provided much more detailed information than what is available through other data collection methods, such as questionnaire surveys because it involved institutions and provided a more relaxed atmosphere in which to collect information as respondents may feel more comfortable having a conversation with the study about their program as opposed to filling out a survey. Participants for the interview were selected from persons with physical and visual impairments, government officials, and private organizations who are engaged in giving transport service. Participants for the focus group discussion on the other hand were selected only from PwDs.

3.6.3 Focus group discussion

Focus group members were recruited with the representatives or authorized persons of concerned organizations, Association of person with disabilities and members of associations. As a result, most focus groups represented person with the same types of disabilities. The focus groups were aimed at identifying problems encountered while using transport environments, and gathering suggestions on improvements to the transport system.

3.7 Data Processing and Analysis

Data analysis is a process by which researchers reduce data to a store and its interpretation (LeCopte&Schensul, 1999). It is a process of reducing large amounts of collected data to make sense of them. There are several approaches to data analysis in the study. The results of the questionnaires, interviews, focus group discussion and observation were analyzed using MS Excel (Micro soft excel) 2007. Frequency tables and descriptive statistics were constructed to display results with respect to each of the questions about general information, challenges and causes of the problems.

The percentage analysis was used to analyze and identify the most accessibility challenges of from the respondents and the same approaches were used for analysis of the causes of poor implementation of transport policy systems. Based on the notion that, Persons with disabilities were a sensitive group of respondents. Agency were notable stakeholders, information for the most part of the study was obtained through questionnaires and field survey. The answers to the structured part of the questionnaire were based on one of the most commonly used scaled-response format questions in satisfaction scale survey design called 5-point Likert-scale format to measure satisfaction i.e. Very agree, agree , Indifferent (Neither agree nor disagree), Disagree and Very disagree. The reasons for adopting this scale were: a) to provide simplicity for the respondent to answer; and b) to make the analysis of collected data easier.

3.8 Ethical Considerations

All research studies present a number of ethical and moral dilemmas which must be identified and addressed prior to carrying out any research study in order to protect all participants from potential harm. The first ethical issue begins with securing ethical clearance from ASTU, Research and Publication Office School ethical Review boards. To this end, the researcher has obtain formal letters which helps to access all places, individuals and organizations which were affiliated with this study.

Privacy and confidentiality has maintained at all times, all findings have described in a confidential manner. It is ethical to respect the privacy of respondents of this study. Audio taped interviews will be transcribed verbatim, thus no names will be recorded during the interviewing process.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter focuses on the analysis of results and discussion from data collected through site survey , questionnaires, interviews, focus group discussion with individuals from different disability Associations as well as stakeholder sectors and literature review concerning the existing accessibility of the physical road transport environment, the major challenges experienced by Person with disability in accessing of road infrastructure facilities and investigation of the extent of implementation of policy frameworks/standard guidelines that ensures the accessibility in light with PwDs.

The analysis of data collected through questionnaires has examined the socio-economic and demographical characteristics and the results of the finding from the analysis of accessibility of transport environment from respondents which explores most significant factors that influence PwDs to access road infrastructures facilities on the livelihood of PwDs have been discussed and finally what can or need to be done to solve the problems and what is to be involved were also explained.

4.2 Respondent profile

4.2.1 Response Rate and Demographic Characteristics of Participants

Profiles of respondents were crucial for the analysis of the paper and clearly reveal the reliability of data. Data were collected from two types of disability targeted that is physically & visually impaired persons. A total of 100 questionnaires were distributed to a selected sample of respondent in the 10 sub-cities of Addis Ababa.

Table 4. 1 Sampling by type of disability

S/No.	Types of disability	Relative sample	% Sample
1	Physical impairments	75	75%
2	Visual impairments (blind)	25	25%
Total Numbers		100	100%

Table 4. 2The response rates of the questionnaires by respondent’s categories for Nifas Silk sub-city

S/ No.	Respondents Categories	Questionnaire Distributed in	Questionnaire Returned in	Un-responded Questionnaire	Analyzed Questionnaire in	
		Number	number	in number	number	Percent
1	Physical impairments	8	8	0	8	80
2	Visual impairments (blind)	2	2	0	2	20
Total Numbers		10	10	0	10	100

Table 4.3: The response rates of the questionnaires by respondents categories for Kerkos sub-city

S/ No.	Respondents Categories	Questionnaire Distributed in	Questionnaire Returned in	Un-responded Questionnaire	Analyzed Questionnaire in	
		Number	number	in number	number	Percent
1	Physical impairments	7	7	0	7	70
2	Visual impairments (blind)	3	3	0	3	30
Total Numbers		10	10	0	10	100

Table 4. 4:The response rates of the questionnaires by respondents categories for Addis sub-city

S/ No.	Respondents Categories	Questionnaire Distributed in	Questionnaire Returned in	Un-responded Questionnaire	Analyzed Questionnaire in	
		Number	number	in number	number	Percent
1	Physical impairments	8	8	1	7	70
2	Visual impairments (blind)	2	2	0	2	20
Total Numbers		10	10	1	9	90

Table 4.5: The response rates of the questionnaires by respondents categories for Gulale sub-city

S/ No.	Respondents Categories	Questionnaire Distributed in	Questionnaire Returned in	Un-responded Questionnaire	Analyzed Questionnaire in	
		Number	number	in number	number	Percent
1	Physical impairments	6	6	0	6	60
2	Visual impairments (blind)	3	3	0	3	30
Total Numbers		9	9	0	9	90

Table 4. 6: The response rates of the questionnaires by respondents categories for Areda sub-city

S/ No.	Respondents Categories	Questionnaire Distributed in	Questionnaire Returned in	Un-responded Questionnaire	Analyzed Questionnaire in	
		Number	number	in number	number	Percent
1	Physical impairments	7	7	0	7	70
2	Visual impairments (blind)	3	3	1	2	20
Total Numbers		10	10	1	9	90

Table 4.7: The response rates of the questionnaires by respondents categories for Yaka sub-city

S/ No.	Respondents Categories	Questionnaire Distributed in	Questionnaire Returned in	Un-responded Questionnaire	Analyzed Questionnaire in	
		Number	number	in number	number	Percent
1	Physical impairments	8	8	0	8	80
2	Visual impairments (blind)	2	2	0	2	20
Total Numbers		10	10	0	10	100

Table 4.8: The response rates of the questionnaires by respondents categories for Bole sub-city

S/ No.	Respondents Categories	Questionnaire Distributed in	Questionnaire Returned in	Un-responded Questionnaire	Analyzed Questionnaire in	
		Number	number	in number	number	Percent
1	Physical impairments	9	9	1	8	80
2	Visual impairments (blind)	1	1	1	0	0
Total Numbers		10	10	2	8	80

Table 4.9: The response rates of the questionnaires by respondents categories for Lideta sub-city

S/ No.	Respondents Categories	Questionnaire Distributed in	Questionnaire Returned in	Un-responded Questionnaire	Analyzed Questionnaire in	
		Number	number	in number	number	Percent
1	Physical impairments	8	8	0	8	80
2	Visual impairments (blind)	2	2	0	2	20
Total Numbers		10	10	0	10	100

Table 4.10: The response rates of the questionnaires by respondents categories for Kolfe Keraniyo sub-city

S/ No.	Respondents Categories	Questionnaire Distributed in	Questionnaire Returned in	Un-responded Questionnaire	Analyzed Questionnaire in	
		Number	number	in number	number	Percent
1	Physical impairments	8	8	1	7	70
2	Visual impairments (blind)	2	2	0	2	20
Total Numbers		10	10	1	9	90

Table 4.11: The response rates of the questionnaires by respondents categories for AkakiKaliti sub-city

S/ No.	Respondents Categories	Questionnaire Distributed in	Questionnaire Returned in	Un-responded Questionnaire	Analyzed Questionnaire in	
		Number	number	in number	number	Percent
1	Physical impairments	8	8	2	6	60
2	Visual impairments (blind)	2	2	0	2	20
Total Numbers		10	10	2	8	80

Table 4.12: The response rates of the questionnaires by respondents categories for all sub-city

S/ No.	Respondents Categories	Questionnaire Distributed in	Questionnaire Returned in	Un-responded Questionnaire	Analyzed Questionnaire in	
		Number	Number	in number	number	Percent
1	Physical impairments	75	72	3	72	72
2	Visual impairments (blind)	25	20	5	20	20
Total Numbers		100	92	8	92	92

From those questioners 20 visual impairments (blinds), 72 physical impairment respondents were analyzed. The responses rates of Visual and Physical impairments were 20 percent and 72 percent respectively. The response rate of this study considering questionnaire distributed and collected from person with disabilities was 92 percent.

4.2.2 Gender, Age, and Educational status of Respondents

4.2.2.1 Distribution of Respondents by Gender and Disability type

The overall sex distribution of respondent according to their disability category as presented in Table below, there were 61.5 percent male respondents and the remaining 38.5 percent were female, in addition to that figure shows below the percentage of male and female for each type of disability based on sex. Both genders were included in the two disability types to obtain balanced information.

Table 4. 13: Types of disability respondent’s distribution based on sex

			Types of disability		Total
			Physical	Visual	
Gender of respondents	Male	Count	62	18	80
		% within gender of respondents	77.5%	22.5%	100%
		% within types of disability	86.11%	90%	58.49%
		% of Total	62%	18%	80%
	Female	Count	10	2	12
		% within gender of respondents	83.33%	16.67%	100%
		% within types of disability	13.88%	10%	23.88%
		% of Total	10%	2%	12%
Total		Count	72	20	92
		% of Total	70.75%	29.25%	100%

Of the male respondents, 77.5% were physically impaired while 22.5% were visually impaired, on the other hand, of the female respondents; about 83.33% were visually impaired while about 16.67% were physically impaired. These demographic proportions were purposively identified in this research based on availability of the respondents at the locations where the survey was carried.

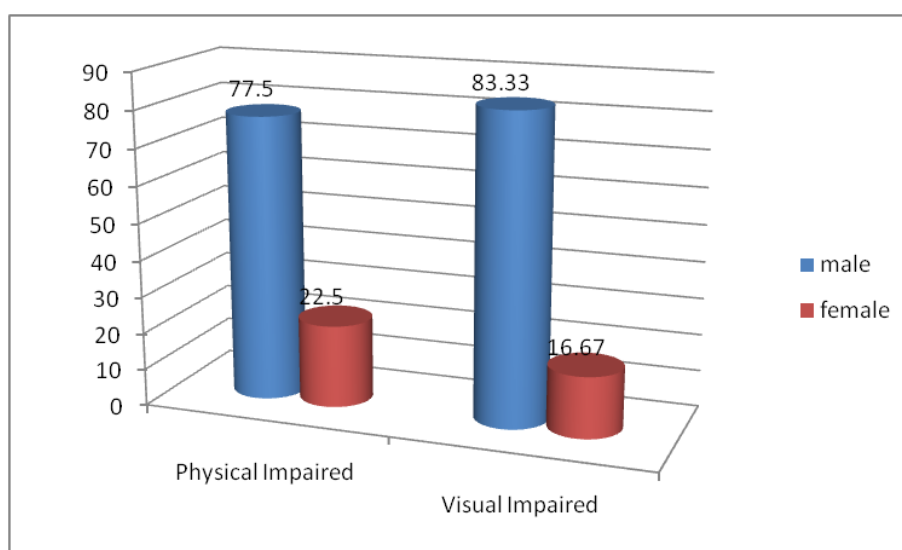


Figure 4. 1Frequency of Disability respondents’ distribution based on sex

4.2.2.2 Distribution of respondents by Age and Type of disability

Distributions of respondents by Age and type of disability is always an important factor while assessing urban road facilities and transport access since it is more often informs the travel challenges and suitability. On the distribution by age groups, the largest majority about 55% of respondents was aged between 18 to 25 years with an unequal distribution of 32.5% and 22.5% for both physically and visually impaired respectively. There were also a considerable proportion of about 28% who were aged between 26-45 years, implying that most transport users are likely for work purpose since the age range of between (24 to 40) constitute the working majority, as shown below.

Table 4.14: Distribution of respondents by Age and Type of disability

			Types of disability		Total
			Physical	Visual	
Age of respondents	Below 18 years	Count	3	-	3
		% within Age of respondents	100%	-	100%
		% of Total	4.167%	-	3.26%
	18-25 years	Count	10	3	13
		% within Age of respondents	76.92%	23.08%	100%
		% of Total	13.89%	16.67%	14.13%
	26-45 years	Count	41	14	55
		% within Age of respondents	74.54%	25.46%	100%
		% of Total	56.94%	77.78%	59.78%
	46-60 years	Count	16	1	17
		% within Age of respondents	94.11%	5.88%	100%
		% of Total	22.22%	5.56%	17%
	Above 60 years	Count	2	-	2
		% within Age of respondents	100%	-	100%
		% of Total	2.78%	-	2.17%
		Count	72	18	92
Total		% of total respondents	72%	18%	92%

Thus, the distribution of respondents' by age vs. disability type is shown in Figure 3.6 and it illustrates that from 92 respondents, 55 percent of them fall in the range of 26 - 45 year and 17 percent of the respondents were in the range of 46 – 60 years. This indicates that more percent of the PwDs participated in the study were part of active and productive society who are able to contribute in the national development of the country. Teenagers and elderly age groups were outliers with less than 13 percent.

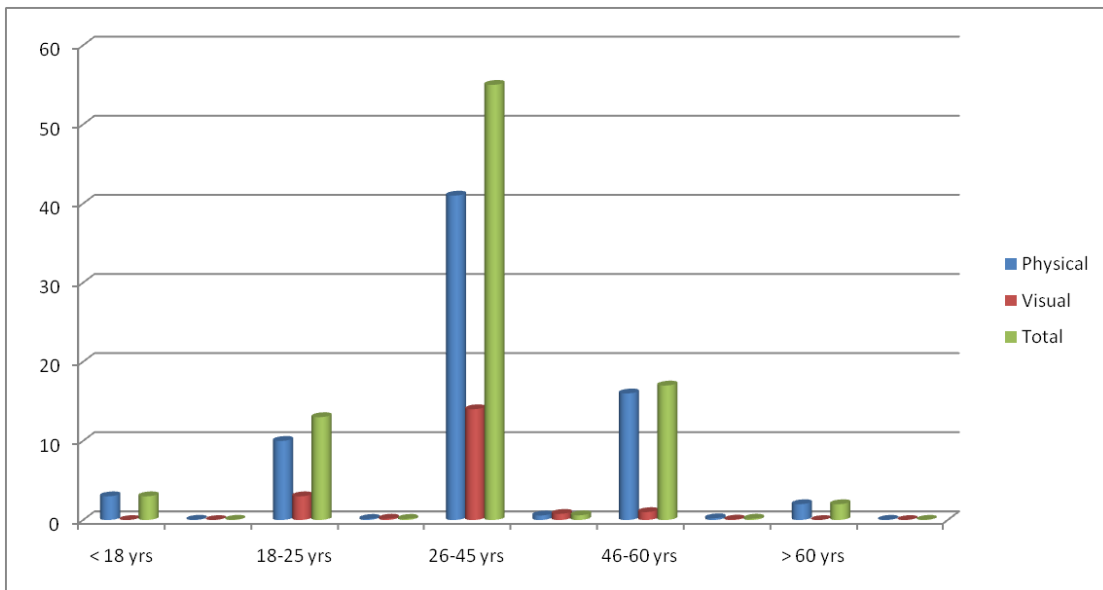


Figure 4. 2: Distribution of respondents by Age and Type of disability

4.2.3.3 Level of Education and Employment of PwDs

The level of education, employment and income of PwDs is vital when analyzing urban transport since they have direct relations to other factors such a travel time, mode, purpose and frequency.

As table 4.15 below illustrates, 27% of the PwDs work in informal sector [mostly family business] and about 20% were jobless and largely went out and about to practice begging. This confirms the contention that in low- income countries disabled people are more likely to be poor than is the rest of the population. Case studies in a number of countries show that higher disability rates are associated with higher illiteracy, poor nutritional status, lower inoculation and immunization coverage, higher unemployment rates, and lower occupational mobility, among other characteristics, all largely as a result of lack of transport access and mobility challenges (Elwan, 1999).

Table 4. 15: Distribution of respondents by the employment status

Employment Status	Physical	Visual	Total Numbers	Percent (%)
Employed	12	6	18	20%
Unemployed	35	5	40	43%
Retired	3		3	3%
Student	4	3	7	8%
Unpaid family worker	3		3	3%
Living with aid of relatives	5	1	6	7%
Getting aid from NGOs	1	4	5	5%
Getting aid from government	2		2	2%
Others	7	1	8	9%
Total numbers	72	20	92	100%

From the analysis of findings, there were 40% PwDs who were not employed. The unemployment is high due to unsuitability of road infrastructure facilities in different sections of Addis Ababa City. This inaccessibility has limited their chances and opportunities for employment.

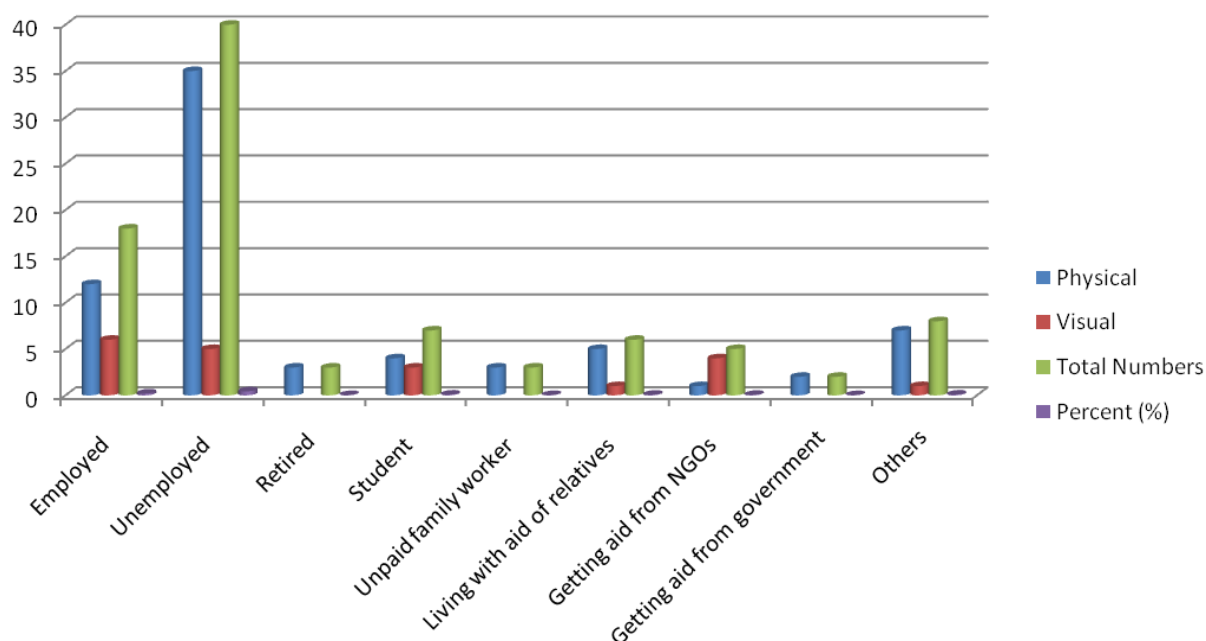


Figure 4. 3: Percentage analysis of employment status

Table 4. 16: Distribution of respondents by the educational status

Educational level	Physical	Visual	Total Numbers	Total Percentage
Uneducated	0	4	4	4%
Read and Write only	4	1	5	5%
1-6	8	0	8	9%
9-10	14	0	14	15%
10+1	2	1	3	3%
10+2	5	0	5	5%
Certificate	7	4	11	12%
Diploma/Level	16	8	24	26%
Degree	12	2	14	15%
M.A /MSC	4		4	4%
Total	72	20	92	100%

Figure below shows that only 4 percent of the respondents did not get opportunity for formal education and they were blind. They respond to questionnaires from their experience with the assistance of a helper. About 5 percent of the respondents can read and write only and 26 percent had diploma/level and most of them have almost more than 15% had bachelor. This indicates that the response from the group is highly reliable as they are capable of analyzing issues under the study.

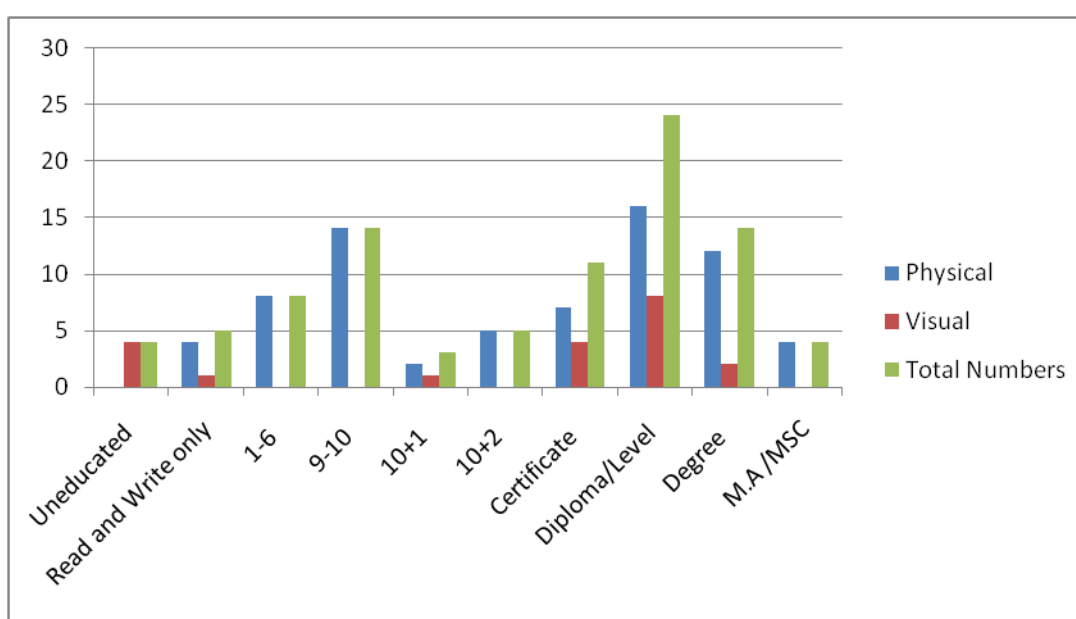


Figure 4. 4: Analysis of educational level of respondents

Out of the 92 participants who participated in the study 26% had Diploma/Level, 15% had a bachelor degrees, 15% had attended 9-10. This is important because the level of education determines the degree of awareness thus determines the level of access to information which determines mobilization. From research findings the People with Diploma or Level of education are the majority. One can deduce that this level of education equips them necessary power to know their rights thus increasing the level of awareness. They could also use this knowledge to sue the government for failing to uphold their rights thus increasing the level of awareness. This also signifies that majority of the study participants were literate and which implies they had the capacity to give dependable information relating to this study.

4.3 Existing Accessibility of Road Transport Environment for PwDs

Accessibility is an important in daily life, especially when dealing with the road transport environment for PwDs and the key aspects of this research. It is also a very significant concern in the assessment of the existing accessibility challenges of road transport for PwDs. Several aspects can be reviewed with respect to accessibility challenges. In this case, accessibility challenges were reviewed with respect to the road infrastructure facilities. The road transport environment was assessed by looking at the road infrastructure facilities from the built up environment such as the road conditions, zebra crossings and also from the response rates.

A critical review of the road infrastructure facility conditions was done through site survey based on the standard guidelines. PwDs were asked to give their opinion on the functionality of road infrastructure facilities.

4.3.1 Problems related to road Infrastructure Facilities from questionnaire survey

The questionnaire of the study considered 5 major common types of existing road infrastructure facilities related problems:-

- ✓ Road Conditions problems such as cracked pavements , curb cut ,unsafe sidewalks &etc
- ✓ Lack of Road Markings / Furniture (e.g. Pedestrians Signals)
- ✓ Road Crossing and Side Walks problems such as walking to Bus station ,Unsuitable street crossing
- ✓ Street Parking problems such as placement and parking area.
- ✓ Road Barriers and curb ramps such as telephone poles, solid waste , market on streets and pavements without curb ramps

The respondents were required to rate the degree of the accessibility of the listed road facilities problems. The table below shows the analysis of percentage of rating for PwDs with respect to different road Infrastructure facilities.

Table 4. 17: Frequency of rating for PwDs related to infrastructure facilities

S/No	Road Infrastructure Facilities	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
1	Poor Road Condition such as Cracked and dangerous pavements	36	26	6	8	16	92
2	Poor Road Marking / Furniture(e.g. Pedestrians signals)	26	22	7	6	31	92
3	Lack of Road Crossing and Sidewalks such as walking to Bus station , unsuitable street	38	18	8	6	22	92
4	Bus stops related problems(such as placement and parking condition)	42	24	5	9	12	92
5	Barriers such as telephone poles, solid waste and pavements without curb ramps	40	25	5	7	15	92

It was necessary to gather the opinion of PwDs on some of the existing road infrastructure facilities conditions in order to understand the level of understanding of the requirements.

Figure below shows the percentage of rating for PwDs with respect to different road Infrastructure facilities.

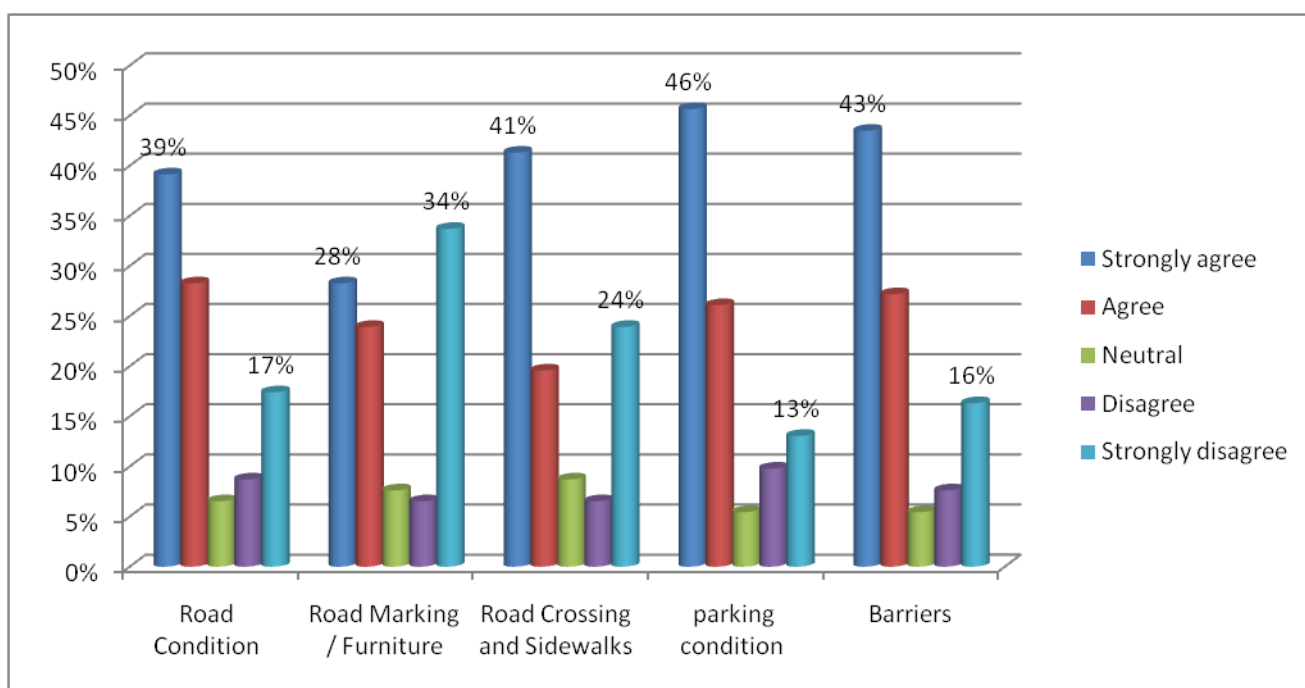


Figure 4. 5: Percentage of rating of PwDs with respect to infrastructure facilities.

Here, it is clear from this percentage analysis that most proportions of the respondents averaging about 46% agrees that Street Parking problems is major existing challenges for PwDs. Road barriers such as telephone poles, solid waste and pavements without curb ramps contributes 43% which is the second major challenges. The road crossing and road conditions such as cracked pavements, unsafe sidewalks problem contributes 41% and 39% respectively. The view of the infrastructure facilities by the PwDs for the cases of road markings where about 34% and this is because of the problem is less in case of Addis Ababa city.

Relative importance index analysis (RII) have also used to identify the most important factors to prioritize indicators based on rated of likert type scales as follows. Street parking problems such as placement and parking area, Road Barriers such as telephone poles, solid waste and pavements without curb ramps are ranked first and second rank based on relative important and and/or mean square value. Actually in Addis Ababa, street parking is a very critical challenge for PwDs to cross or walk.

Table 4. 18: Road Infrastructure Facilities problems related to PwDs

Road Infrastructure Facilities	MEAN	RII	RANK
Poor Road Condition such as Cracked and dangerous pavements	3.63	0.73	3
Poor Road Marking / Furniture(e.g. Pedestrians signals)	3.07	0.61	5
Lack of Road Crossing and Sidewalks such as walking to Bus station , unsuitable street	3.48	0.70	4
Bus stops related problems(such as placement and parking condition)	3.82	0.76	1
Barriers such as telephone poles, solid waste and pavements without curb ramps	3.74	0.75	2

Note: N= total number of respondents, RII= Relative Importance Index

As indicated in table above, the most frequently occurring problem for PwDs were Street Parking problems such as placement and parking Condition (RII, 0.76); respondents acknowledged that this problem were being frequently seen in the infrastructure related problems. The second and the third most common problem reported by respondents were difficulty in road barriers and curb ramps such as telephone poles, solid waste and pavements without curb ramps in crossing roads and road conditions such as cracked pavements ,unsafe sidewalks problem(RII, 0.75 and 0.73) respectively.

Suitable infrastructure provision for people with mobility impairment should be given a due consideration, especially for access to route and route distances, access to public transport,

parking for vehicles, layout and dimensions of footways and footpaths, layout and construction of pedestrian areas, choice and positioning of street furniture, layout and construction of crossing facilities, lighting, and signing.

According to the information collected, many PwDs suffer with increased problems in bus stops related problems (such as placement and parking condition), barriers such as telephone poles, solid waste and pavements without curb ramps, lack of road crossing and sidewalks such as walking to bus station, unsuitable street, poor road marking/furniture (e.g. pedestrians signals), poor road condition such as cracked and dangerous pavements sequentially. From the results of Relative importance index (RII), all the factors have a medium importance level ranging from 0.6 to 0.8. In terms of mean values, the factors that are taken during the survey have mean values more than average for a 5 point likert scale which is 3 while Bus stops related problems have a mean value of 3.535 ranking first according to the respondents and poor road condition such as cracked and dangerous pavements was ranked least with mean value 3.202.

Street furniture can pose a physical obstruction to visually impaired pedestrians and individuals in wheelchairs. This includes any object which is placed on the footway (such as seats, bollards, solid waste bins, barriers, telephone poles, utilities' boxes, lampposts and traffic signs). It is especially important to consider the concerns of people with disabilities and to make information as clear and easy to understand as possible by creating signs and information in a format that people with disabilities can use.

Having poor road conditions in cities causes problems for the users of the road as a whole but the PwDs suffer more due to the damaged pavements, cracking and related conditions. People with mobility impairments can't easily access such kind of roads which were observed in the roads of the city resulting discomfort and injuries. The figures below illustrate the observed issues in relation to road infrastructure facilities in numerous sub cities of Addis Ababa.

Figure 4.6 below shows cracked and damaged pavements in Addis Ketema subcity from Gojam Berenda to St- John Churchstreet and from Medanialem Avenue to Mesalemia.



Figure 4. 6: Cracked and damaged pavements

Unsafe walk ways and open ditch holes that do not allow passengers to pass as well as road barriers (telephone poles, trees, liquid, stored materials, and solid waste) was observed in almost all sub cities of Addis Ababa which are demonstrated in the section bellows.

Several other infrastructure problems have been observed in the city such as lack of ramp for wheelchairs, lack of tactile surface for visual, uneven surface road for wheelchairs, raised edge at crossing, narrow walkways, absence of proper drainage system, and cracked walkways.

The people in the city should be cooperative enough to serve the PwDs to make sure they are getting consideration and help in using infrastructure services as they want. This could be depicted by having positive attitude, helping them cross the streets, awaring about the streets and showing them how to get services and giving them priority.

4.3.2 Problems related to road infrastructure facilities from Field Survey

Addis Ababa has 5 major arterial gate roads that radiate from the city center to different parts of the country. These are to Fiche, to Ambo, to Weliso, to Debrezit, to Debrebrhan directions.

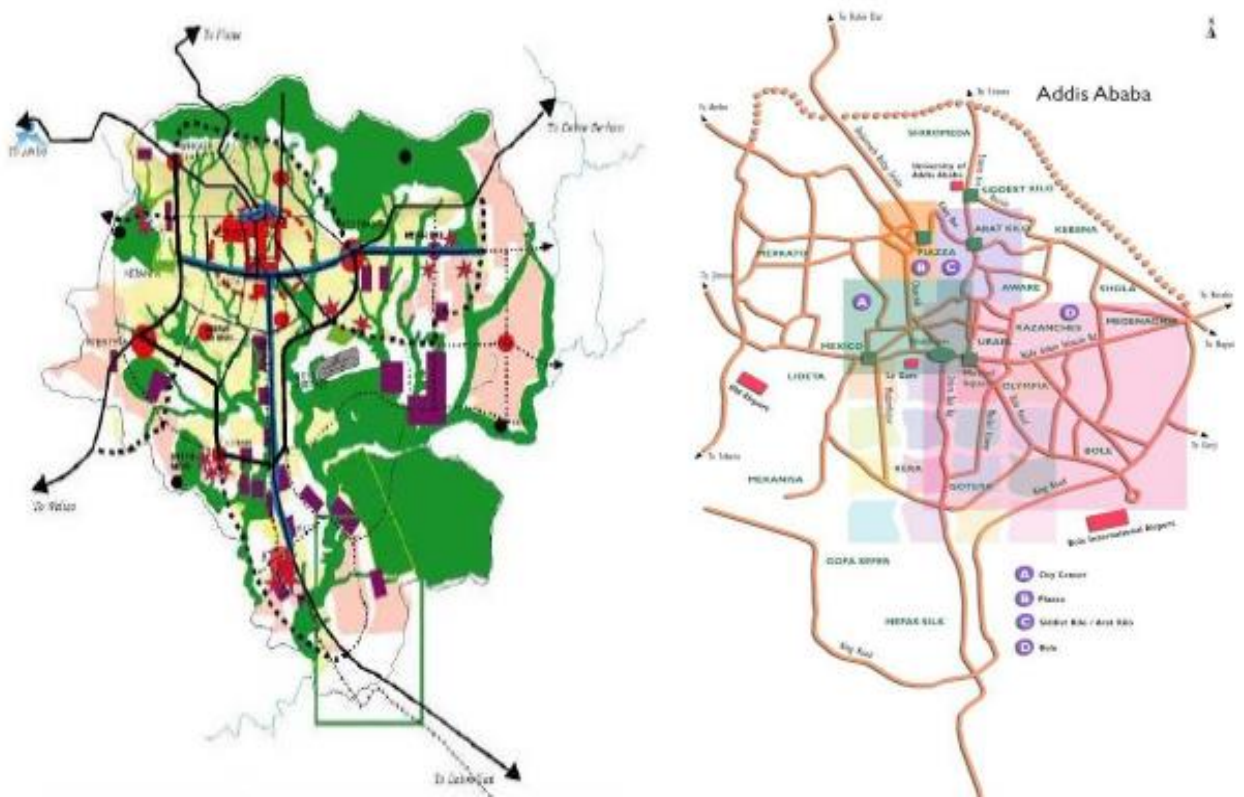


Figure 4. 7: Addis Ababa City major arterial gate roads

This section discusses the physical barriers to person with disability as they travel in the Addis Ababa sub-cities. The findings from the auditing scheme indicates the presence, condition and/or dimension of pedestrian sidewalk, curb, drop kerb, crossing points, rest spots, traffic control signals and crossing points.

4.3. 2.1 Road Segments in Nifas Silk sub city

The following table depicts the condition and dimensions of selected road facilities of Nefas silk sub-city in four segments. The availability of the facilities and level of their availability for Nefas silk sub city is clearly put in the table. Distance they cover is discussed in this table i.e. Pedestrian facility, walkway on the side of road curb cut and zebra crossing are available with the range of 3.20m-3.8m width, walkway on the road side available with 2.60m-3.30m width, curb cut available with 15cm-33cm height and zebra crossing available with 4.00m-5.00m width respectively, while Signage and other obstacles, Disability parking space, Disability parking space, Bus stop, curb ramps at bus stop are Not available.

Table 4. 19: Outline numbers, conditions and dimension of road facilities in Nifas Silk sub-city at selected four segments

Road accessibility elements	Jemo 1 to Mekanisa	Jemo 1 to Mebrat	Korea square to Sar-bet square	Mebrat to Germen square
Pedestrian facility	Available in poor condition having 3.8m width	Available in poor condition having 3.65m width	Available in good condition having 3.20m width	_____
Walkway on side of road	Available at both side with width of 3.00 m	Available at both side with width of 3.30m	Available at one side	Available at both side with width of 2.60m
Curb cut	Available with 20cm height	Available with 33cm height	Available with 15cm height	Available with 20cm height
Zebra crossing	Available having width of 5.00m	Available having width of 4.00m	Available having width of 4.00m	Available having width of 4.00m
Tactile surface, obstacle and signage	Not available	Not available	Not available	Not available
Signage and other obstacles	Not available	Not available	Not available	Not available
Disability parking space	Not available	Not available	Not available	Not available
Communication tools directional signs	Not available	Not available	Not available	Not available
Curb ramps at bus stop	Not available	Not available	Not available	Not available

Throughout the study, the most dominant pedestrian facility observed was pedestrian sidewalk, which ensured a complete separation of pedestrians from vehicles. In all, routes with sidewalk constituted about most segments examined for this study and these included routes at both sides. Though the pedestrian sidewalk was dominant, its condition and dimension did not fully follow the prescribed dictates of an integrated transport system as cited by the UNDP (2010). Observed sidewalk width in the all sub cities ranged from 1.05 to 2 meters and this dimension conforms to DFID's (2004) ideal sidewalk width from 1 meter in areas of limited space to 2 meters in areas with ample space. This dimension is ideal since it permits at least a wheelchair user and a non-wheelchair user to use the sidewalk at the same time without any collision. Though the width of observed sidewalks conformed to UNDP's (2010) view, not all parts of the roads on campus had sidewalks.

The problems of road in Nifas Silk sub city such as road barrier, road conditions, road markings, road crossings and parking conditions are measured by using the degree of problems and almost all are under very critical.

Table 4. 20: Degree of road facility problems @ Nifas Silk sub-city in four different segments

Types of problem		Degree of problem @ Nifas Silk sub-city				Total number of segment
		Very critical	Critical	Partial	Not critical	
Road Barriers such as pavement without curb ramps , telephones post, solid wastes and etc.	No.	3		1		4
	%	75		25		
Road Conditions such as cracked pavements and unsafe sidewalks and etc.	No.	2	1	1		
	%	50	25	25		
Road Marking/ Furniture (e.g. Pedestrian Signals for Visual Impaired)	No.	4				
	%	100				
Road Crossing and Side Walks such as walking Distance to Bus station, unsuitable street crossing and etc.	No.	2	1	1		
	%	50	25	25		
Bus stops or parking Conditions such as placement and Parking Condition	No.	1	2	1		
	%	25	50	25		
	Total	12	4	4	0	20

The above table portrays that different degree of criticality for road facility problems of Nifas silk sub city in four segments. The street parking problems takes the major part of criticality by 60%, then followed by Road barriers 75%, Road conditions 50%, Road Crossing and sidewalks 50% of the total Percent as (very critical)of the problem. Data from the field survey revealed that, only 60% of routes with road facility on Nifas Silk Sub-city were rated as good and those 40% were routes with full of path obstruction .This section discusses the physical barriers to person with disability as they travel in the city. The findings from the auditing scheme indicates the presence, condition and/or dimension of pedestrian sidewalk, curb, drop kerb, crossing points, rest spots, traffic control signals and crossing points.

Segment 1: From Jemo 1 to mekanisa Streets



Figure 4. 8: Lack of ramp for wheelchairs users



Figure 4. 9: lack of tactile surface for visual impaired



Figure 4. 10: Open Ditch and Obstacles on Walkway.

Segment 2:Jemo 1 to Mebrat



Figure 4. 11: Accumulation Waste materials and Open ditch Holes on Walkways



Figure 4. 12: Construction site wastes on side of walkway and uneven surface road for wheelchairs.

Segment 3: Korla Avenue to Sarbet Avenue



Figure 4. 13: Obstacles on Walkway.

4.3. 2.2 Road Segments in Kirkos sub-city

In Kirkos sub-city the road accessibility elements are measured by observation and the following table shows about pedestrian facility which is available for all road segments. Walk way side and curb cut are somewhat available but not fully accessed for PWDS.

Table 4. 21 Outline numbers, conditions and dimension of road facilities in Kirkos sub-city at selected five segments

Road accessibility elements	Stadium to Ambassador cinema	Stadium to Mexico square	Meskel Square to Ureal	Meskel Square to Denbel	Meskel Square to Global
Pedestrian facility	Available having width 4.30m	Available in poor condition having 3.90m width	Available in good condition having 3.20m width	Available in poor condition having 4.60m width	Available
Walkway on side of road	Available at both side with width of 3.10 m	Available at both side with width of 3.00m	Available at one side	Available at both side with width of 4.00m	Available at both sides
Curb cut	Available with 21cm height	Available with 19.0cm height	Available with 15cm height	Available with 22cm height	Available with 17cm height
Zebra crossing	Available having width of 4.00m	Available having width of 3.00m	Available having width of 4.00m	Available having width of 5.50m	Available having width of 5.00m
Tactile surface and signage	Available in good status having width 0.60m	Available in good status having width 0.50m	Available in poor status having width 0.60m	Available in poor status having width 0.50m	Available in poor status having width 0.60m
Signage and other obstacles	Not available	Available	Not available	Not available	Available
Disability parking space	Not available	Not available	Not available	Not available	Not available
Communication tools directional signs	Not available	Not available	Not available	Not available	Not available
Bus stop	Available	Available	Available	Available	Available
Curb ramps at bus stop	Available with height 2.00m	Available at both side of height 2.00m	Available with height 2.10m	Available with height 1.80m	Not available

Table 4. 22: Degree of road facility problems @ Kirkos sub-city in five different segments

Types of problem		Degree of problem @ Kirkos sub-city				Total number of segment
		Very critical	Critical	Partial	Not critical	
Road Barriers such as pavement without curb ramps , telephones post, solid wastes and etc	No.		1	4		5
	%		25	75		
Road Conditions such as cracked pavements and unsafe sidewalks and etc	No.		1	4		
	%		25	75		
Road Marking/ Furniture (e.g Pedestrian Signals for Visual Impaired)	No.	5				
	%	100				
Road Crossing and Side Walks such as walking Distance to Bus station, unsuitable street crossing and etc	No.			5		
	%			100		
Bus stops or parking Conditions such as placement and Parking Condition	No.		1	4		
	%		25	75		

For the selected road segments in kirkos sub-city, the condition of these roads plays a major role in determining the level of convenience in its usage. The basis for rating the level of convenience in using these sidewalks was on the degree of dislodged or cracked pavements, poorly fitted and how even the surface was irrespective of the path material used. Data from the field survey revealed that, only 75% of routes with pavements in sub-city were rated as good and these were routes with no path obstruction, well fitted bricks and even surfaced pavement. The poor and average rated routes recorded 25% and 50% respectively and these were areas with one or a combination of dislodged aggregates or potholes, electric poles and signage on pavement as well as an uneven pavement surface. If the segment in question had at most two electric poles or sign post, a relatively small pothole and a fairly even surface, this route would pass for a pavement that presents an average rating in terms of convenience. On the other hand, any route with at least, two electric poles, many potholes and a rugged surface would qualify for a route which offers the least convenience and would be rated low or poor inconvenience.

Kirkos Sub-City

Segment 1: From Meskel Square to Urael



Figure 4. 14: No tactile surface for visual disability and open ditch on pedestrian way

Segment 2: From Meskel Square to Dembel Bole



Figure 4. 15: Road barriers and improper aligned tactile surface for visual disabled

Segment 3: From Meskel Square to Global



Figure 4. 16: Raised edge at crossing and dismantled tile from walkway



Figure 4. 17: Accumulation of waste materials that cover walkway and lack of tactile surface for visual disabled

Segment 4: From Stadium to Mexico Square



Figure 4. 18: lack of ramp for wheelchair users to reach railway station

Segment 5: From Stadium to Ambassador Cinema



Figure 4. 19: Telephone pole and uncovered Hole on walkways

4.3. 2.3 Road Segments in Addis Sub-city

The road accessibility elements are observed in four basic road segments from Addis Sub-city. The questionnaire and observational results are clarified in the following tables. From the segments Medhanialem square to Mesalemia have poor access in road accessibility elements. Tactile surface and signage, the zebra crossing, Walkway on side of road and curb cut are not available on this segment.

Table 4. 23: Outline numbers, conditions and dimension of road facilities in Addis sub-city at selected four segments

Road accessibility elements	Gojjam berenda to Yohannis church	Gojjam berenda to Mesalemiya	Autobis-tera to Abinet	Medihanialem square to Mesalemiya
Pedestrian facility	Available in poor condition having 2.80m width	Available in poor condition having 3.00m width	Available in good condition having 3.50m width	Not available
Walkway on side of road	Available at both side	Available at both side with width of 1.00m	Available at both sides having width 2.80m	Not available
Curb cut	Available with 50cm height	Available with 20cm height	Available with 16cm height	Not available
Zebra crossing	Available having width of 3.80m	Available having width of 3.50m	Available having width of 3.50m	Not available
Tactile surface and signage	Not available	Available in poor condition having 0.50m	Available in poor condition having 0.60m	Not available

		width	width	
Signage and other obstacles	_____	Not available	Not available	_____
Disability parking space	Not available	Not available	Not available	Not available
Communication tools directional signs	Not available	Not available	Not available	Not available
Bus stop	Not available	Available	Available	Not available
Curb ramps at bus stop	Not available	Not available	Not available	Not available

Table 4. 24: Degree of road facility problems @ Addis sub-city in four different segments

Types of problem		Degree of problem @ Addis sub-city				Total number of segment
		Very critical	Critical	Partial	Not critical	
Road Barriers such as pavement without curb ramps , telephones post, solid wastes and etc	No.	4				4
	%	100				
Road Conditions such as cracked pavements and unsafe sidewalks and etc	No.	4				
	%	100				
Road Marking/ Furniture (e.g Pedestrian Signals for Visual Impaired)	No.	4				
	%	100				
Road Crossing and Side Walks such as walking Distance to Bus station, unsuitable street crossing and etc	No.	1	3			
	%	25	75			
Bus stops or parking Conditions such as placement and Parking Condition	No.	1	1	2		
	%	25	25	50		

Addis Sub-City

Segment 1: From Gojam Berenda to St- John Church



Figure 4. 20: improper parking on walkways and zebra



Figure 4. 21: Cracked pavements, unsafe walkways that do not allow passengers to pass and road barriers (telephone poles, liquid and solid waste).



Figure 4. 22: Curb cuts with raised at zebra obstructing wheelchairs.

Segment 2: From Gojam Berenda to Mesalemia



Figure 4. 23: Accumulation of wastage on side walkways and installation of obstructions on walkways



Figure 4. 24: Curb cuts with raised at zebra obstructing wheelchairs.

Segment 3: From Autobis Tera to Abinet



Figure 4. 25: Obstacles that prevent disabilities to walk on side ways



Figure 4. 26: parking on road crossing



Segment 4: From Medanialem Avenue to Mesalemia



Figure 4. 27: Cracked road and lack of walkway access

4.3. 2.4 Road Segment in Gulale Sub-city

In providing sidewalks to separate pedestrians from vehicles, the rate of usage of these sidewalks would heavily be impaired if there are objects that stand in the path of pedestrians. In the view of these objects obstruct the flow of traffic and influence disabled travellers' choice of route that presents the least obstruction, forfeit the intended trip or share the road with the vehicles even though there is a sidewalk present. Out of the 38 segments reviewed for the study, 52.6 percent of the segments recorded the presence of objects on the sidewalk that restricted the free movement of pedestrians. Notable among these objects were street lights, sign posts, protruded tree branches or roots, dwarf walls and potholes.

Table 4. 25: Outline numbers, conditions and dimension of road facilities in Gulele sub-city at selected three segments

Road accessibility elements	Addis Gebeya to general wenget	Addis Gebeya to dilber	Addis Gebeya to Chilot square
Pedestrian facility	Available in good status having 2.35m width	Available in good condition having 2.80m width	Available in good condition having 3.10m width
Walkway on side of road	Available at both side with width of 1.75 m	Available at both side with width of 3.00m	Available at both side with width of 2.50m
Curb cut	Available with 26cm height	Available with 33cm height	Not available
Zebra crossing	Available having width of 4.80m	Available having width of 4.00m	Available having width of 3.00m
Tactile surface and signage	Available in good status having 0.60m width	Not available	Available in good status having 0.60m width
Signage and other obstacles	Not available	Not available	Not available
Disability parking space	Not available	Not available	Not available
Communication tools directional signs	_____	Not available	Not available
Bus stop	Available	Available	Available
Curb ramps at bus stop	Not available	Not available	Not available

Table 4. 26: Degree of road facility problems @ Gulele sub-city in three different segments

Types of problem		Degree of problem @ Gulele sub-city				Total number of segment
		Very critical	Critical	Partial	Not critical	
Road Barriers such as pavement without curb ramps , telephones post, solid wastes and etc	No.	1	1	1		3
	%	33.33	33.33	33.33		
Road Conditions such as cracked pavements and unsafe sidewalks and etc	No.	1	2			
	%	33.33	66.67			
Road Marking/ Furniture (e.g Pedestrian Signals for Visual Impaired)	No.	3				
	%	100				
Road Crossing and Side Walks such as walking Distance to Bus station, unsuitable street crossing and etc	No.		1	2		
	%		33.33	66.67		

Bus stops or parking Conditions such as placement and Parking Condition	No.			3		
	%			100		

Gulele Sub city

Segment 1: From AdisuGebeya to ChilotAdebabayi



Figure 4. 28: Cracks of walkways and obstacle object on walkways

Segment 2: From Adisu Gebeya to Dilber



Figure 4. 29: accumulation of waste material on walkways and open ditch

Segment 3. From Adisu Gebeya to Winget



Figure 4. 30: Obstacle on tactile surface, improper walkways and uneven surface for wheelchair

4.3.2.5 Road Segments in Bole Sub-city

Bole road hosts broad spectrum of destinations in a stretch of just less than 5 km and provides good connectivity to the city center, key transport nodes and public spaces (Meskel Square). Along this corridor lie three places of high activity concentrations at zone/district1 (Bole), district 4 (Olympia) and district 5 (Flamingo) that may face urban fragmentation due to barrier effect imposed by the new motorway infrastructures. The road accessibility elements are observed in four basic road segments from Bole Sub-city. For routes with pavements, the condition of these pavements plays a major role in determining the level of convenience in its usage. The basis for rating the level of convenience in using these sidewalks was on the degree of dislodged aggregates, poorly fitted stones and how even the surface was irrespective of the path material used. Data from the field survey revealed that, only 61% of routes segments with pavements were rated as good and these were routes with no path obstruction, well fitted and even surfaced pavement. The poor and average rated routes recorded 42 and 52% respectively and these were areas with one or a combination of dislodged or potholes, electric poles and signage on pavement as well as an uneven pavement surface. If the segment in question had at most two electric poles or sign post, a relatively small pothole and a fairly even surface, this route would pass for a pavement that presents an average rating in terms of convenience. On the other hand, any route with at least, two electric poles, many pot holes and a rugged surface would qualify for a route which offers the least convenience and would be rated low or poor inconvenience.

Table 4. 27: Outline numbers, conditions and dimension of road facilities in Bole sub-city at selected five segments

Road accessibility elements	Bole Air- port to Bole Michael	Bole Air- port to Rwanda	Bole Medihanialem to Ureal	Dembel Square to Bole Rwanda	22-square to Edina moll
Pedestrian facility	Available in poor condition having 6.80m width	Available in good condition having 3.25m width	Available in good condition having 2.60m width	Available in good condition having 3.50m width	Available in poor condition having 1.5m width
Walkway on side of road	Available at both side with width of 6.00 m	Available at both side with width of 3.00m	Available at both side with width of 2.20m	Available at both side with width of 3.10m	Available at both side with width of 2.70m
Curb cut	Available with 17cm	Available with 16cm	Available with 15cm	Available with 15cm	Available with 20cm

	height	height	height	height	height
Zebra crossing	Available having width of 4.00m	Available having width of 6.00m	Available having width of 3.40m	Available having width of 3.10m	Available having width of 4.00m
Tactile surface and signage	Not available	Not available	Not available	Available at one side having width of 0.50m	Not available
Signage and other obstacles	Not available	Not available	Not available	Not available	—
Disability parking space	Not available	Not available	Not available	Not available	Not available
Communication tools directional signs	Not available	Not available	Not available	Not available	Not available
Bus stop	Available	Available	Available	Available	Available
Curb ramps at bus stop	Not available	Available having height 2.00m	Not available	Available having height 1.80m	Not available

Table 4. 28: Degree of road facility problems @ Bole sub-city in five different segments

Types of problem		Degree of problem @ Bole sub-city				Total number of segment
		Very critical	Critical	Partial	Not critical	
Road Barriers such as pavement without curb ramps , telephones post, solid wastes and etc	No.	3	2			5
	%	60	40			
Road Conditions such as cracked pavements and unsafe sidewalks and etc	No.	3	2			
	%	60	40			
Road Marking/ Furniture (e.g Pedestrian Signals for Visual Impaired)	No.	5				
	%	100				
Road Crossing and Side Walks such as walking Distance to Bus station, unsuitable street crossing and etc	No.	1		4		
	%	20		80		
Bus stops or parking Conditions such as placement and Parking Condition	No.		3	2		
	%		60	40		

Bole sub city

There are some tree branches which have protruded into the pavement. So, for PwDs that walk on the street would like a bit careful, they may hit their head or crash into some of the branches. With some places, too, they may encounter electric poles in the middle of the pavement. With these things in such places, they may easily hit and sustain some injuries while walking on such routes. The other challenge is the presence of the hawkers who sell their products on the pavement. Those people have not even move their goods when they see PwDs coming on streets and when they bump into them, they don't even apologize to them. It's very annoying some times.

Segment 1: From Bole Airport to Bole Michael



Figure 4. 31: Improper walkway, tactile surface, and unsafe for disable people



Figure 4. 32: Road barriers (trees and telephone poles) and open ditches

Segment 2: From Bole Airport to Rwanda



Figure 4. 33: lack ramp for wheelchair users at crossing



Figure 4. 34: Absence of proper drainage system and trees on walkways

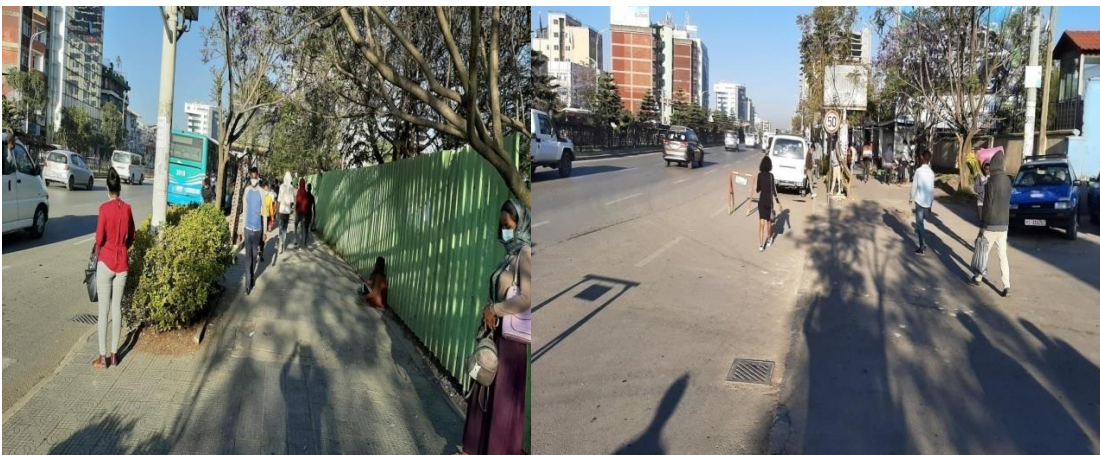


Figure 4. 35: Lack of tactile surface for visual disability and absence of proper walkway

Segment 3. From Bole Medihanialem to Urael



Figure 4. 36: Cracked walkways and storage of materials on walkways and lack of proper drainage



Figure 4. 37: lack of tactile surface for visual disabled



Figure 4. 38: using walkways for trade and storage purpose

Segment 4. From Dembel square to Bole Rwanda



Figure 4. 39:crack of walkway, and trading on pedestrian walk and lack of tactile surface

4.3. 2.6 Road Segments in Lideta Sub-city

Observation of the road segments in lideta sub-city reveals that curb heights ranging from 130 to 180 millimeters. A minimum curb height of 130 millimeters ensures the safety of road users.. At this minimum height, pedestrians are also deemed safe since a car cannot easily find its way on to the pavement unless the driver has deliberately decided to park on the pavement. For the visually impaired and the wheelchair user too, the relatively high curb offers guidelines to detect the edge of the pavement and also identifies any significant change in height as PwDs moves from the pavement to the road and vice versa. In simple terms, curb cuts are to be placed at points where one would have to transit from the road to the sidewalk or vice versa, and without this facility wheelchair user in particular would find it extremely difficult to join the sidewalks with minimum curb height of 130millimetres. The table below shows the conditions and dimension of road facilities.

Table 4. 29: Outline numbers, conditions and dimension of road facilities in Lideta sub-city at selected three segments

Road accessibility elements	Lideta square to Torhayil square	Lideta square to Mexico square	Lideta square to Abinet Square
Pedestrian facility	Available in average condition having 3.5m width	Available having 6.75m width	Available in good condition having 3.40m width
Walkway on side of road	Available at both side with width of 3.00 m	Available at both side with width of 4.00m	Available at both side with width of 3.00m
Curb cut	Available having 16cm height	Available having 19cm height	Available having 14cm height

Zebra crossing	Available having width of 3.00m	Available in poor status having width of 3.00m	Available having width of 3.00m
Tactile surface and signage	Available in poor condition having 0.50m width	Available in good condition having 0.50m width	Available in good condition having 0.50m width
Signage and other obstacles	Not available	Not available	Not available
Disability parking space	Not available	Not available	Not available
Communication tools directional signs	Not available	Not available	Not available
Bus stop	Available	Available	Available
Curb ramps at bus stop	Available	Not available	Available having height 0.20m

Table 4. 30: Degree of road facility problems @ Lideta sub-city in three different segments

Types of problem		Degree of problem @ Lideta sub-city				Total number of segment
		Very critical	Critical	Partial	Not critical	
Road Barriers such as pavement without curb ramps , telephones post, solid wastes and etc	No.		1	2		3
	%		33.33	66.67		
Road Conditions such as cracked pavements and unsafe sidewalks and etc	No.		1	2		
	%		33.33	66.67		
Road Marking/ Furniture (e.g Pedestrian Signals for Visual Impaired)	No.	3				
	%	100				
Road Crossing and Side Walks such as walking Distance to Bus station, unsuitable street crossing and etc	No.	2	1			
	%	66.67	33.33			
Bus stops or parking Conditions such as placement and Parking Condition	No.	1	1	1		
	%	33.33	33.33	33.33		

Lideta Sub-City

Segment 1: From Lideta Square to Abinet Square



Figure 4. 40:Open ditch and road barriers on walkway

Segment 2: From Lideta Square to Mexico Square



Figure 4. 41:Construction fence on walkway and dismantled walkway tile

4.3. 2.7 Road Segments in Kolfe-keranio Sub-city

From the field survey of road segment in the kolfe keranio sub city several road infrastructure problems have been observed such as lack of ramp for wheelchairs, lack of tactile surface for visual, uneven surface road for wheelchairs, raised edge at crossing, narrow walkways, absence of proper drainage system, and cracked walkways. Suitable infrastructure provision for people with mobility impairment should be given a due consideration, especially for access to route and route distances, access to public transport, parking for vehicles, layout and dimensions of footways and footpaths, layout and construction of pedestrian raised areas, choice and positioning of street furniture, layout and construction of crossing facilities, lighting, and signing.

According to the information collected, many PwDs suffer with increased problems in bus stops related problems (such as placement and parking condition), barriers such as telephone poles, solid waste and pavements without curb ramps, lack of road crossing and sidewalks such as walking to bus station, unsuitable street, poor road marking/furniture (e.g. pedestrians signals), poor road condition such as cracked and dangerous pavements sequentially.

Table 4. 31 : Outline numbers, conditions and dimension of road facilities in Kolfe-Keranio sub-city at selected four segments

Road accessibility elements	Keranio square to Yeshi Debele square	Bethel square to Keranio square	Mendida square to Torhayiloch square	Ayer-Tena square to Torhayiloch square
Pedestrian facility	Available in poor condition having 3.50m width	Available having 3.30m width	Available in poor condition having 3.28m width	Available in poor condition having 3.25m width
Walkway on side of road	Available at both sides with width of 3.50 m	Available at both sides with width of 3.30m	Available at both sides with width of 3.28m	Available at both sides with width of 11.50m
Curb cut	Available with 16cm height	Available with 15cm height	Available with 21cm height	Available with 28cm height
Zebra crossing	Available having width of 4.00m	Available having width of 4.00m	Available having width of 4.00m	Available having width of 6.00m
Tactile surface and signage	Not available	Not available	Not available	_____
Signage and other obstacles	Not available	Not available	Not available	Not available
Disability parking space	Not available	Not available	Not available	Not available
Communication tools directional signs	Not available	Not available	Not available	Not available
Bus stop	Available	Available	Available	Available
Curb ramps at bus stop	Not available	Not available	Not available	Not available

Table 4. 32: Degree of road facility problems @ Kolfe Keraniyo sub-city in four different segments

Types of problem		Degree of problem @ Kolfe Keraniyo sub-city				Total number of segment
		Very critical	Critical	Partial	Not critical	
Road Barriers such as pavement without curb ramps , telephones post, solid wastes and etc	No.	3	1			4
	%	75	25			
Road Conditions such as cracked pavements and unsafe sidewalks and etc	No.	4				
	%	100				
Road Marking/ Furniture (e.g Pedestrian Signals for Visual Impaired)	No.	4				
	%	100				
Road Crossing and Side Walks such as walking Distance to Bus station,	No.		4			
	%		100			

unsuitable street crossing and etc						
Bus stops or parking Conditions such as placement and Parking Condition	No.		2	2		
	%		50	50		

KolfeKeraniyo Sub-City

Segment 1: From Weyra Bethel to Keraniyo Avenue



Figure 4. 42: pop out coble road and obstacles on walkways



Figure 4. 43:raised edge at crossing which is not comfort to wheelchair users

Segment 2: Keraniyo Avenue to YeshiDebele Avenue



Figure 4. 44: accumulation of waste materials and road barriers on walkways



Figure 4. 45: Advertising poster on walkways and not comfortable walkways for disabled

Segment 3: Mendida Avenue to Tor Hayloch Avenue



Figure 4. 46: Obstacles on walkways and raised edge at zebra



Figure 4. 47:waste materials and pop out tile on walkways

Segment 4: From Ayer Tena Avenue to Tor Hayloch Avenue



Figure 4. 48:Raised edge at zebra and improper walkways for disabled

4.3. 2.8 Road Segments in Akaki Kality Sub-city

Poor condition of the pedestrian mobility is the major challenging issues in Akaki kality sub city. Pedestrian facility is the average area provided for each pedestrian in a walkway. The width of the pedestrian walkway is playing a great role in the provision accessible pedestrian mobility. However, the existing width of pedestrian walkway of Akaki kality is below standard and can't afford people with disabilities which are about less than one (<1 M) meter size and this leads to overcrowded and initiates traffic accidents. Pedestrian walk ways is available

provided on both sides of the road segments but curb cuts is raised 15-20 cm above the carriage way.

Table 4. 33: Outline numbers, conditions and dimension of road facilities in Akaki-Kality sub-city at selected four segments

Road accessibility elements	Saris Abo to Kdisco square	Maseltega to Adeyi-Abeba	Maseltega to Saris Abo
Pedestrian facility	Available in poor status	Available in poor condition	Available in poor condition
Walkway on side of road	Available at both sides with width of 3.00 m	Available at both sides with width of 4.20m	Available at both sides with width of 2.50m
Curb cut	Available with 15cm height	Available with 20cm height	Available with 19cm height
Zebra crossing	Available having width of 4.75m	Available having width of 4.05m	Available having width of 4.90m
Tactile surface and signage	Not available	Available in poor condition having 0.50m width	Not available
Signage and other obstacles	Not available	Not available	Not available
Disability parking space	Not available	Not available	Not available
Communication tools directional signs	Not available	Not available	Not available
Bus stop	Available	Available	Available
Curb ramps at bus stop	Not available	Not available	Not available

Akaki Kality is one of an economically developing sub city in Addis Ababa and there are different constructions of various industrial buildings, however in different places the construction materials are dumped on pedestrian walkways that obstructs person with disability, even it obstructs the able one. More than 75% of road segments are very critical with road barriers and cracked pavements, unsafe sidewalks, unsuitable street crossing and difficult parking conditions. Such an obstruction on pedestrian walkway and attitude of the pedestrian to use the side walkway aggravate traffic accident.

Table 4. 34: Degree of road facility problems @ Akaki Kality sub-city in four different segments

Types of problem	Degree of problem @ AkakiKality sub-city				Total number of segment
	Very critical	Critical	Partial	Not critical	

Road Barriers such as pavement without curb ramps , telephones post, solid wastes and etc	No.	3	1			4
	%	75	25			
Road Conditions such as cracked pavements and unsafe sidewalks and etc	No.	4				
	%	100				
Road Marking/ Furniture (e.g Pedestrian Signals for Visual Impaired)	No.	4				
	%	100				
Road Crossing and Side Walks such as walking Distance to Bus station, unsuitable street crossing and etc	No.	4				
	%	100				
Bus stops or parking Conditions such as placement and Parking Condition	No.	4				
	%	100				

Akaki Kality Sub-City

Segment 1: From Meseltegna to AdeyAbeba



Figure 4. 49:Pop out and broken tile from walkways



Figure 4. 50: lack of walkway access and road barriers on walkways

Segment 2: From Kelity Menaherya to Mesaltegna



Figure 4. 51:improper walkway and waste materials on road

Segment 3: From Mesaltegna to Saris Abow



Figure 4. 52:Trade activity on walkways



Figure 4. 53:Lack of proper walkway

Segment 4: Saris Abow to AdeyAbebaKadisco Square



Figure 4. 54: improper walkways for disabled



Figure 4. 55: accumulation of stone and garden trees on walkway

4.3.2.9 Road Segments in Arada Sub-city

An accessible environment has ample, well connected pedestrian facilities with unobstructed space for movement, consistent pavement surfaces, appropriately sloped ramps, and safe pedestrian crossings. Pedestrians' movements are not restricted to lanes or specific routes; however, they are restricted by the physical boundaries around them such as the presence of walkways or pedestrian ways. Therefore, the needs of the pedestrians should be considered in the design of transportation facilities. Some of the Pedestrian facilities include sidewalks, paths, crosswalks, stairways, curb cuts and ramps, and transit stops. These facilities should be pedestrian friendly to promote walking and safety of the pedestrians

Table 4. 35: Outline numbers, conditions and dimension of road facilities in Arada sub-city at selected five segments

Road accessibility elements	Atakilt-tera to T/hayimanot square	4kilo square to Minilik square	4kilo square to British embassy	4kilo square to 6kilo University	A/petros square to Gedamsefer
Pedestrian facility	Available in poor condition having 3.80m width	Available in good condition having 5.40m width	Available in good condition having 4.00m width	Available in good condition having 8.35m width	Available in poor condition having 2.75m width
Walkway on side of road	Available at both side with width of 2.50 m	Available at both side with width of 5.00m	Available at both sides having width 4.00m	Available at both side with width of 6.00m	Available at both side with width of 2.10m
Curb cut	Available with (10-26)cm height	Available with 27cm height	Available with 23cm height	Available with 18cm height	Available with 16cm height
Zebra crossing	Available having width of 4.10m	Available having width of 3.90m	Available having width of 4.00m	Available having width of 4.00m	Available having width of 3.55m
Tactile surface and signage	Not available	Available in goog status having 0.60m width	Available in goog status having 0.90m width	Available in goog status having 0.90m width per both side	Available in poor status having 0.0m width
Signage and other obstacles	Not available	Not available	Available	Available	Not available
Disability parking space	Not available	Not available	Not available	Not available	Not available
Communication tools	Not available	Not available	Not available	Not available	Not available

directional signs					
Bus stop	Not available	Available	Available	Available	Available
Curb ramps at bus stop	Not available	Available having height 0.20m	Available having height 0.20m	Available having height 0.21m	Available having height .20m

Table 4. 36: Degree of road facility problems @ Arada sub-city in five different segments

Types of problem		Degree of problem @ Arada sub-city				Total number of segment
		Very critical	Critical	Partial	Not critical	
Road Barriers such as pavement without curb ramps , telephones post, solid wastes and etc	No.	1	1	3		5
	%	20	20	60		
Road Conditions such as cracked pavements and unsafe sidewalks and etc	No.	1	1	3		
	%	20	20	60		
Road Marking/ Furniture (e.g Pedestrian Signals for Visual Impaired)	No.	5				
	%	100				
Road Crossing and Side Walks such as walking Distance to Bus station, unsuitable street crossing and etc	No.		2	3		
	%		40	60		
Bus stops or parking Conditions such as placement and Parking Condition	No.	1	1	3		
	%	20	20	60		

Arada Sub-city

Segment 1: 4 kilo Square to English Embassy



Figure 4. 56: Trees, road barriers (telephone poles, liquid and solid waste) and stored materials on walkways



Figure 4. 57:lack of ramp for wheelchair users

Segment 2: From 4 kilo Square to Millennium Square

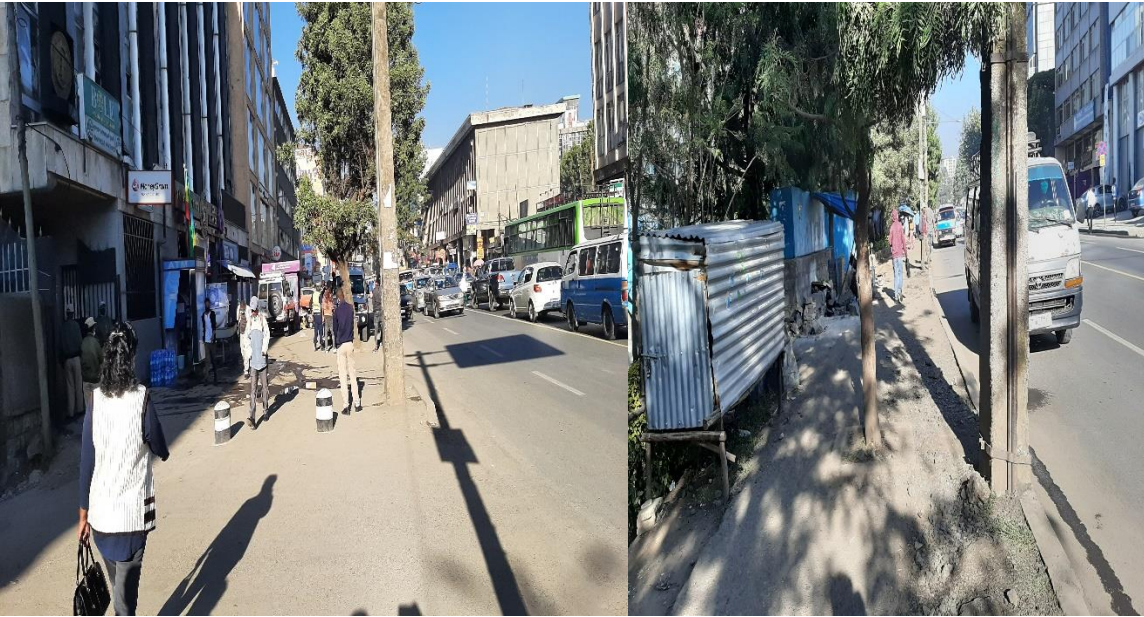


Figure 4. 58:Store, Guardhouse and other obstacles on walkways



Figure 4. 59: lack of proper walkways and tactile surface for visual disabled

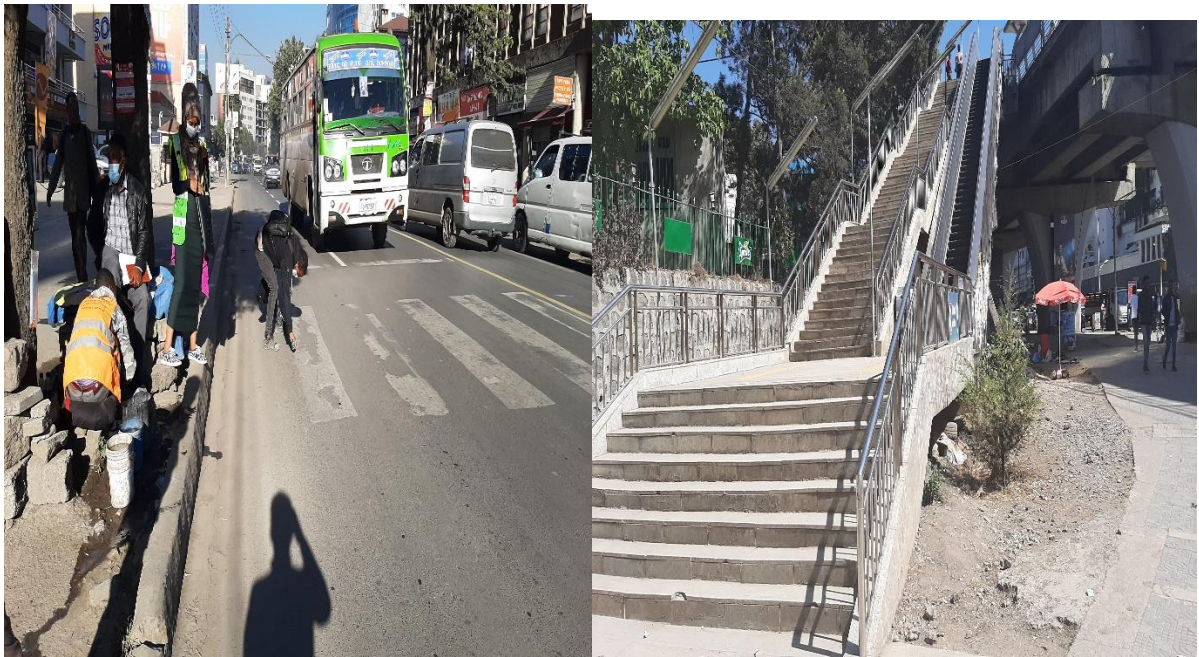


Figure 4. 60: Raised edge at crossing and lack of ramp for wheelchair users to climp the bridge

Segment 3: From Abuna Petros to Sebeta Babur



Figure 4. 61: Construction fence and trade activity on walkways



Figure 4. 62:parking on walkways and raised edge at crossing zebra

Segment 4 : From Atekta Tera to Tekla Haymanot Church



Figure 4. 63:lack of proper walkways



Figure 4. 64: Road barriers and narrow walkways

4.3.2.10 Road Segments in Yeka Sub-city

In Yeka Sub-city, the most dominant road facility observed was pedestrian sidewalk that is available in good condition having 3.60m width in all segments examined for this study and these also includes walkway on both side of roads with varying dimensions.

Table 4. 37: Outline numbers, conditions and dimension of road facilities in Yeka sub-city at selected three segments

Road accessibility elements	Megenagna to 22-Global	Diaspora square to British embassy	Metebaber building to Signal
Pedestrian facility	Available in good condition having 3.60m width	Available in good condition	Available in good condition having 3.00m width
Walkway on side of road	Available at both sides with width of 3.60 m	Available at both sides with width of 4.30m	Available at both sides
Curb cut	Available with 20cm height	Available with cm height	Available with cm height
Zebra crossing	Available having width of 5.05m	Available having width of 4.00m	Available having width of .00m
Tactile surface and signage	Available in good condition having 0.50m width	Available in poor condition having 0.60m width	Available having 0.60m width
Signage and other obstacles	_____	Not available	Available at a distance of 3.00m from the curb
Disability parking space	Not available	Not available	Not available
Communication tools directional signs	Not available	Not available	Not available
Bus stop	Available	Available	Available
Curb ramps at bus stop	Not available	Available having height 0.50m	Available having height 0.20m

Some of accessibility problem in Yeka sub-city includes Road Barriers such as pavement without curb ramps, telephones post, solid wastes and etc . The pavement has not without curb ramps only it has potholes so when you are a little distracted while walking on such pavements, you may step into a stagnant water or even step in those pits which may cause injuries. Some sections of the pavements have road signs or sign post erected in the middle of the pavement. With these ones too, if you are not aware, you may easily bump into some of them especially when you are walking from straights to junctions.

Table 4. 38: Degree of road facility problems @ Yeka sub-city in three different segments

Types of problem		Degree of problem @ Yekasub-city				Total number of segment
		Very critical	Critical	Partial	Not critical	
Road Barriers such as pavement without curb ramps , telephones post, solid wastes and etc	No.		1	2		3
	%		33.33	66.7		
Road Conditions such as cracked pavements and unsafe sidewalks and etc	No.		1	2		
	%		33.33	66.7		
Road Marking/ Furniture (e.g Pedestrian Signals for Visual Impaired)	No.	3				
	%	100				
Road Crossing and Side Walks such as walking Distance to Bus station, unsuitable street crossing and etc	No.			3		
	%			100		
Bus stops or parking Conditions such as placement and Parking Condition	No.		1	2		
	%		33.33	66.7		

Yeka Sub-City

Segment 1: From Megenegna to Golagol



Figure 4. 65 lack of proper walkway and settled walkways



Figure 4. 66:Shoes Shining and releasing liquid waste on the walkway

Segment 2: From Diaspora Square to British Embassy



Figure 4. 67:Trees and stored stone on pedestrian way



Figure 4. 68:Pop out tile from walkway and lack of tactile surface for visual disabled

Moreover, all of the interviewed officials agreed about the poor accessible of the road infrastructure facility especially during planning, design and construction stage in all sub cities of Addis Ababa. These officials have agreed on the inaccessibility of the built environment due to the existence of inappropriate network of routes, lack of comfortable parking spaces for person with disabilities, limited traffic signs and signals.

According to the respondents from Association of PwDs the major challenges to their movements were: cracked pavements, unsafe sidewalks, crossing roads, intersections without curb ramps, street crossings and pedestrian signals that are not audible to individual with visual disabilities, telephone poles, solid waste, street traders, and street children blocking sidewalks. In addition to that, at focus group discussions most of the participants complain about the existing road environmental barriers, especially solid waste, liquid waste open ditch and open manhole have a huge impact to the basic accessibility problems.



Figure 4. 69: Focus group discussion held with an association of PwDs

From the discussions held with key informants from implementation agencies like A.A Municipality & AACRA office , Addis Ababa Road and Transport Management Agency (AARTMA) inclusion of PwDs accessible road infrastructure facilities at design stage still remains a subjective matter to the implementing agencies. This is because the country has not reviewed the detailed road design manuals to include the issues of accessibility for PwDs. For example, in 2013, ERA has published the guidelines on mainstreaming or cross-cutting issues in the roads sectors which highlighted broad policy statements, but there exist no particularly specific standard on the design of these facilities in Ethiopia inclusive of PwDs’ requirements.

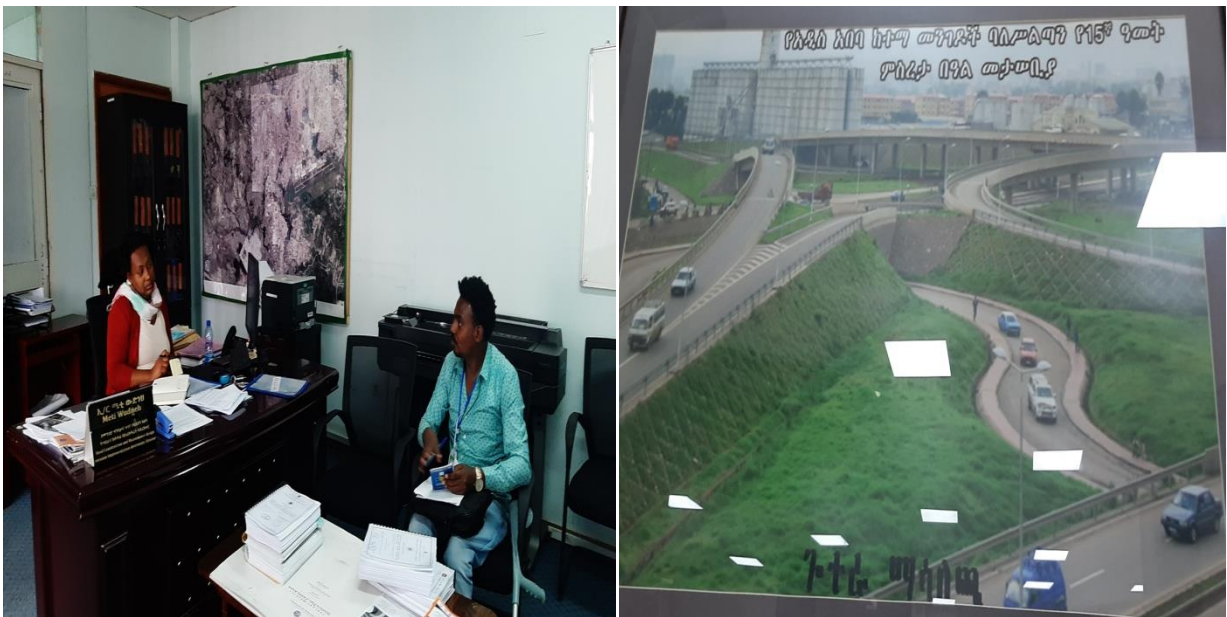


Figure 4. 70: Interview held with AACRA Office

The best practice requires that road crossings are integrated with the aspects with crossing clearly marked on the surface of the road, installing signals with advance warning to vehicles to stop or giving priority to pedestrians, warning to visually impaired pedestrians that they are approaching street crossing, method of informing visually impaired pedestrian when it is safe to cross. If signalized, traffic should be stopped long enough to allow slow walkers to cross, good street lighting, traffic calming to reduce vehicle speed and to divide two-way roads into two parts using central pedestrian refuges.

4.4 Major Causes of Poor Accessibility in Transport Environment

In this section, response from the questionnaires and focus group discussion on causes of current condition of road infrastructure facility for person with disability was analyzed. Moreover, the study also conducted observation on the existing road transport environments supported by figures from field survey. Hence, this part of the analysis indicated that there were various causes of the accessibility problems.

Accordingly the data collected through questionnaires, focus group discussion and field survey was depicted in table below. There are five major causes of poor accessibility in road transport environment for PwDs that were identified and analyzed as follows.

- ✓ Lack of suitable road Infrastructure provision
- ✓ Road design Defects related to standards guideline
- ✓ Lack of Integration b/n infrastructure & built environment
- ✓ Lack of law Enforcement and policy framework
- ✓ Lack of public Awareness

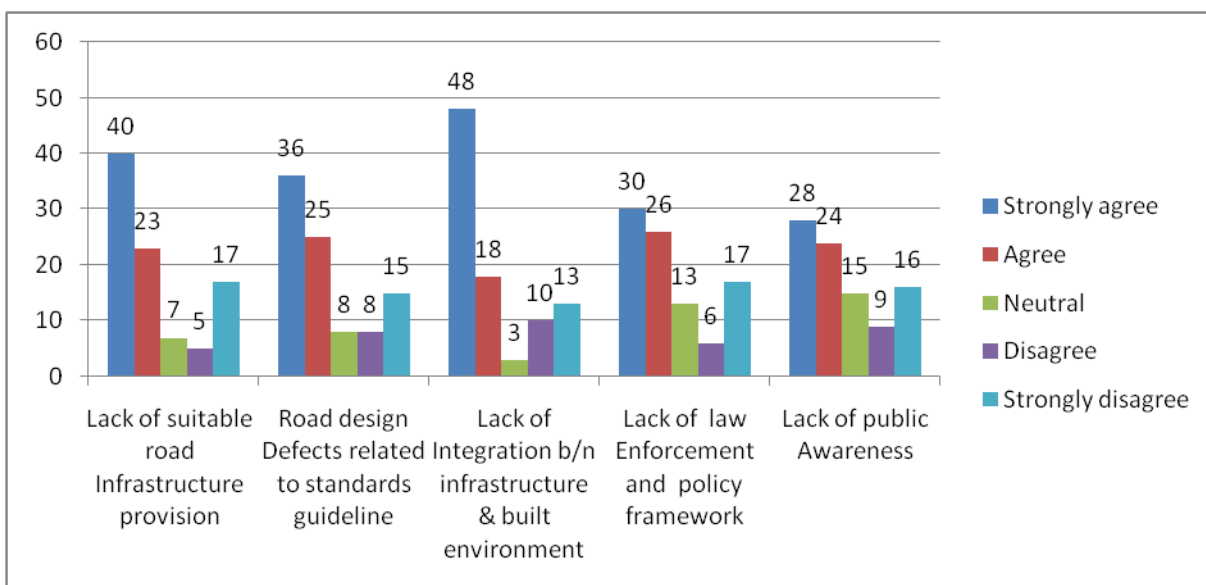


Figure 4. 71: The percentage of the satisfaction levels with respect to causes of inaccessibility

From this analysis, lack of integration between infrastructure and built environment was the first causes of challenges for PwDs with 48%. This indicates the degree of difficulty with which PwDs faces to access the facilities. Lack of suitable road Infrastructure provision were the second most causes of road transport problems with a 40% score, Road design Defects related to standards guideline were the third causes of road transport system problems with percentage a score of 37%. The percentage given by respondents indicated that 30%, 28% strongly agree that there was lack of public awareness and law enforcement towards PwDs respectively.

Thus, the study confirmed that these factors causes inaccessibility for PwDs and also has its own impact to the economic, social and political disadvantages by hinder their mobility's & enforce to stays at home. These factors which cause poor road infrastructure accessibility ,highly affects the basic individuals' need to engage with their community, for obtaining employment, goods and services, health, and education.

Moreover, the road facilities related problems especially the infrastructure provision and environmental barriers bring toward the back the development of urban city.

Table 4. 39: Major causes of poor accessibility of current road transport system

Major causes of poor accessibility in road transport environment	N	Mean	RII	Rank
Lack of suitable road Infrastructure provision	92	3.70	0.74	2
Road design Defects related to standards guideline	92	3.64	0.73	3
Lack of Integration b/n infrastructure & built environment	92	3.85	0.77	1
Lack of law Enforcement and policy framework	92	3.50	0.70	4
Lack of public Awareness		3.42	0.68	5

Note: N= total number of respondents, RII= Relative Importance Index

Poor infrastructure accessibility affect all parts of the society, but the impact on people with disabilities may be substantially different in terms of increased isolation. Inability to provide infrastructures that can give easy access to the disabled part of the society can be a step in causing problems in relation to accessibility of public services. With respect to this, addressing the major causes of poor accessibility in road transport environment helps in solving the consequences that may emerge from it. From this survey the main causes for poor accessibility has been noted as environmental barrier or obstruction, infrastructure provisions, poor law enforcement, and lack of public awareness all having medium importance ranging from 0.6 to 0.8 as per the results of RII. The mean values of the factors also indicate tha all values are more than the average that can be taken as important factors depending up on the respondents' point of view.

Disabilities hinder people's equal participation in society because of overwhelming environmental barriers, including inaccessible transport systems with poor infrastructure. As a result of poor accessibility to transportation system basically roads infrastructure many people with disabilities remain trapped in their homes, unable to live independently and participate in society on an equal basis with others.

Good accessibility legislation needs to be properly enforced and implemented. Poor enforcement and implementation may result from low resources. Legislation linked with strong structure for the enforcement yields better results as laws by itself couldn't solve the issues of PwDs. For instance, laws may be set for the public to give priority and leave seats for the disabled ones however if there is no way to aware the public and enforce the law in everyday life the PwDs will still suffer from inability in accessing the infrastructures.

The Integration of infrastructure & built environment are a combination of poor accessibility to public transport; inaccessible workplaces, poor education services and stigma often make it very difficult for a person with disabilities to find employment. In addition, trees and plants can improve the visual and environmental appearance of an area. However, they can cause problems for people with mobility impairments if they are not sited and maintained correctly. Specialist advice should be sought when choosing tree species to ensure that trees do not have shallow, wide-spreading roots which will lift the footway surface.

Creating awareness in the public offers support for the tasks that ensure accessibility in terms of implementing the policy, cultivating cooperation, and providing the required attention. According to the survey lack of public awareness was ranked least showing that it is not most important relative to the other factors. As the disabled persons live with the public and it has a great influence on them educating or awaring the public plays a greater role in solving the issues in relation to accessibility of public transport in the city.

Infrastructure provision was the first causes of challenges for PwDs with 48% as stated above. This indicates accessibility of road urban facilities or the degree of ease with which PwDs can access the full range of urban facility's spaces, shops, employment, leisure, social services and so on is with high problematic. Thus, the built environment should be accessible for all people including PwDs. As a result this causes even the poor implementations of urban design, PwDs become poorly mobile or they prefer to stay at home. Moreover, they lack confidence, curbed from working and have limited social interaction and the majority of them are with low income.

Even though; Most of the transport policy, regulation and guidelines supports the right for accessibility in relation to person with disabilities, it is however serious problem due to poor implementation of policy. According to the Ethiopian constitution, Article 9 sub-article 4, all international agreements ratified by Ethiopia are an integral part of the law of the land. Therefore, because of the agreement of Ethiopia with UN Convention on the Rights of Persons with disabilities, the policy related to Person with disabilities is taken as policy for Ethiopian person with disabilities.

The issue of accessibility does not seem to have a long history in Ethiopia. For this reason, not many physical structures or informational services are disability friendly. Yet, the government of the Federal Democratic Republic of Ethiopia recognizes the importance of accessibility in the life of persons with disabilities. It is understood that independent living and full participation is hardly possible in the circumstance that environmental and informational barriers continue to challenge the lives of persons with disabilities (FDRE Ministry of Foreign Affairs, 2012).

The transportation policy states person with disabilities as a social issue with the following policy strategies:

- ✓ In order to minimize the risks of vulnerability in the vicinities of schools and health facilities, complement special traffic management system and install appropriate traffic signage indicating such institutions.
- ✓ In order to address the needs of the person with disabilities; children, the elderly and women, road designs, vehicle's height and seats in public transport shall be considered.
- ✓ Public transport vehicles design shall also address the special needs of these categories of the society.
- ✓ Ensure that the transport providers have created a conducive environment in transporting the elderly so that the elderly gets comfortable service.
- ✓ Provide separated parking facilities and clearly mark with the necessary signs to the disabled persons, so that they can be served conveniently on phase by phase basis.
- ✓ Ensure special support and care for vulnerable sections of the society in traffic management.

As policy strategy, it is a very good starting point for implementation of accessibility for PwDs. But on the ground, the reality is totally different; the infrastructure is not accessible there are a lot of improvements that can be done to accommodate their needs in the current facilities for person with disabilities, the flow entity especially design of public transport is not accessible, and also poor system control. Thus, Even though the policy strategies appreciate accessible transportation for PwDs, it lacks implementation of policy appropriately.

4.5 Strategies for Improving Accessibility of Road Infrastructure Facility for PwDs

This section describes various ways to improve accessibility for person with disabilities. Current road infrastructure facility practices tend to focus on certain types of accessibility improvements, particularly those that decrease facility barriers. Accessibility and mobility demand varies depending on the quality of options available. It can be improved by developing new transport and location options that better respond to consumer needs and preferences. Accessibility can be improved by increasing roadway capacity and design speeds, improving traffic management, improving parking facility capacity and convenience, and increasing vehicle safety. Road transport improvements can increase mobility and accessibility in several ways. They improve mobility for non-drivers and increase transport affordability, and they can reduce traffic and parking congestion.

Accessibility is a key concept in design. According to the data collected through questionnaire and interview, there are various factors which contributed to poor implementation of the road transport system policy. These are;

- ✓ Limitation on the availability of organized transport plan
- ✓ Implementing ability of the transportation plan
- ✓ The absence of accessibility guidelines for the design of road facilities
- ✓ Legal enforceability of the on board policy

The results of the findings from analysis related to Factors which contributed to poor implementation of the road transport system policy are depicted in Table below.

Table 4. 40: Factors which contributed to poor implementation of the transport policy

Factors causing poor implementation of road transport policy	N	Mean	Standard deviation	RII	Rank
Limitation on the availability of organized transport plan	92	2.87	2.79	0.57	4
Lower implementing ability of the transportation plan	92	2.99	2.90	0.60	3
Absence of legal enforceability of the on board policy	92	3.11	2.99	0.62	2
Absence of accessibility guidelines for the design of road facilities	92	3.16	3.08	0.63	1

Note: N= total number of respondents, RII= Relative Importance Index

Transportation policy tries to make decisions concerning the allocation of transport resources. It deals with developing a set of constructs and propositions aimed at achieving certain goals in terms of social, economic, and environmental conditions, as well as the operation and performance of the transportation system. The purpose of transportation policy is to make effective decisions on transportation resource allocation, as well as the management and regulation of existing transportation activities.

The factors which contributed to the poor implementation of the transport policy in relation to person with disability has been ranked in sequence as absence of accessibility guidelines for the design of road facilities (mean value = 3.16), absence legal enforceability of the on board policy (mean value = 3.11), implementing ability of the transportation plan (mean value =2.87) and limitation on the availability of organized transport plan (mean value = 2.99) depending up on the survey. According to the respondents of the survey limitation on the availability of organized transport plan and implementing ability of the transportation plan were claimed to have lower contribution. However, that doesn't mean the factors do not influence the implementation of the transport policy.

Transport planning allows for the proper implementation of road transportation policies. Limitation on the availability of organized transport plan relates to the lack of preparation and implementation of actions designed to address specific problems. These results in the ineffective enforcement of the policy which indicates couldn't solve problems that are related to accessibility issues for the PwDs in practice.

Implementing ability of the transportation plan requires resources and coordination. To put the plan into practice continuous effort and follow up, organizing and monitoring play a great role. Apart from the responsible body for the policy and strategy all parts of the society both the disabled and non-disabled have their own part in building the capacity to implement the transportation plan. Lack of initiation, coordination and resource may influence the execution of the plan which contributes to the poor implementation of the transport policy. Policy by itself can do nothing without a proper structure and implementation to make actions that make sure the accessibility of road facilities for PwDs.

Enforcement of transportation policy needs legal framework that include laws to be enforced and parties responsible to execute the policy and strategy. The absence of legal enforceability of the on board policy has a direct relation to the poor implementation of transport policy. The survey also emphasizes the importance of this factor in hampering the execution of policy and facilitation of road services for the PwDs.

Moreover PwDs was not participated in the planning, design and implementation of an accessible road transport system and were neither considered as stakeholders. They have no room in road & transportation office either to plan and implement the accessibility design in the city transport system. In principle for effective implementation of policy, the process of policy formulation should be participatory. According to the interview and focus grouped discussion with PwDs, in Addis Ababa city the Person with disability were claiming about policy formulation regarding accessibility and they have not considered as well as participating in the policy plan.

Therefore, they have no information about the road transport policy and guidelines. Moreover the officials agreed on the reasons for lack of participation, such that person with disabilities are less in numbers than others, participating them is not found to be important, policy formulated was not specified for PwDs and these were some of the reasons for limited participation. Therefore, a lack of information about the policy and enforcements on the policy has its own contribution for limited implementation policy & inaccessibility.

According to the interview with government Transport officials and experts at the association of person with disabilities ,give support according to their interest. For example, they provide wheelchairs and pointer by collaboration of various NGOS; but they had limited integration with other organizations. And also they have no integration with transport office to improve accessible road transportation system for PwDs. The respondents also agreed on the lack of coordination of design of transport vehicles in the city. So, there is a high demand of accessible design of road infrastructure facility in the newly coming strategic city development plan and modification to accessibility guidelines for PwDs. Therefore, the result concludes that lack of coordination between different offices and associations of person with disabilities contributed to absence of accessibility guidelines and poor implementation status of transport policy.

4.5.1 Measures taken to improve accessibility conditions for PwDs

The results of the study indicated the most problematic obstacles were road accessibilities in which different sector officials interviewed and the various possible solutions were suggested. The main problem needed to be solved and how to improve their accessibility to road transport according to this issue of the existing situation in relation to the best practices is presented in this section. The finding with regard to the examination of the existing transport environment was clearly the poor accessibility related to road infrastructure facilities that hinder the mobility of PwDs. This findings show that difficulties due to road infrastructure facilities problems to access in the several sections of city or strategic locations of the study area were identified with their routine problems regarding these facilities.

There are many possible measures available on standards and features related to accessible road infrastructure facilities. Such as the check list is shown below. By applying such checklists during the design and approval stages of road transport projects, one can ensure the accessibility for PwDs.

Table 4. 41: Measures taken to Minimize Problems related to road infrastructure facilities

Types of Facility	Issues identified	Possible Solutions
Curb cuts	Not smooth. Existing 20cm raised edges obstruct wheel chair users and pedestrian with difficulty to trip up.	Level the curbs to the road surface and remove the edges.
Sidewalks	Some sidewalks have damaged and not repaired on timely manner, thus obstacle the pedestrian with disabilities. 50cm sidewalks are too narrow and are sometimes blocked by vehicles, debris, or other obstacles.	Make the path as direct and obstacles free as possible. Consider widening the textured lane where the width of sidewalks permits. Install different shaped tactile points to alert users of turns.
Pedestrian crossing	Pedestrians signal do not have audio features to alert the visually impaired of the signal phase and time remaining for crossings. There are no provisions for kerb ramps to provide level crossing from footway to road. In some sections, the crossing distances are too long for PWDs to comfortably cross.	Consider the audio features and adjusting the phase. Providing level Kerb ramps from Footway to road. Minimize crossing distance, for instance, by extending kerbs across parking lanes or installing center islands.
Footpaths	Full of obstacles, including parked vehicles on the footway. In some sections the gradients are too steep. For the visually impaired people, the layouts are complex and do not accommodate adequate signals.	Remove obstacles, including parked vehicles from the footway. Gradients not too steep. Adequate resting places. Simple layout and adequate cues to visually impaired people. Extending the footway out across parking lanes at a crossing

The improvements of infrastructure facilities such as removing obstacles, removing parked vehicles from the footway, leveling the curbs to the road surface and removing the pavement edges, covered the major targets for accessing transport environment for moving to the workplace, reaching the information desks & other necessary places. The next accessibility solutions related to Pedestrians signal do not have audio features to alert the visually impaired of the signal phase and time remaining for crossings.

The main difficulties in highly urbanized areas like Addis Ababa City is associated with specially visually impaired passengers that have to deal with very problematic tasks that may not seem difficult to other passengers, but usually is an obvious obstacle for them to travel. They need to get on time the specific information due to their inability to go/move faster.

4.5.2 Strategies for Improving Accessibility

Lack of physical accessibility is among the challenging areas for persons with disabilities. An accessible infrastructure benefits not only person with disabilities but also:- Aged persons pregnant women and mothers carrying babies, people with cardiac problems, persons carrying heavy loads, persons with temporary impairment and sick persons or person with overweight. So that accessibility enables people to participate in the social and economic activities for which the built and pedestrian environment is intended.

Universal Accessibility emphasizes that the population cannot be divided into 'able bodied' and 'disabled' people, and rejects the traditional practice of designing for the 'average man'. The popular image of disability is the wheelchair user, but many different people experience access problems. In one way or another, whether in height, weight, strength, speed of movement or dexterity, everyone is different. Thus, there must be a mechanism to steadily follow and to certain extent push technical and social developments. Of primary importance is the establishment of a clear strategy for steadily working towards, improving, maintaining an accessible physical road environment for all.

Ethiopia is one of those countries who signed the UN Convention on the Accessibility of infrastructures for people with disabilities earlier than most countries in the world. However; there is a gap of policy implementation. As results of interviews conducted with key informants, showed the reason of the ill- implementation is because of the poor implementation culture of the country. As a country, we have a lot of wonderful policies but there is always an ill implementation and this is a major reason for the country's mediocrity. The other reason is financial shortage. The government's main target is the Road coverage rather than accessibility. A lot of effort has been putting into the policy's implementation gap and hopefully significant positive change would be seen in the near future. Roads transports have limited participation and integration of persons with disabilities. The following strategies are planned to lessen these problems.

- ✓ Establish laws and regulations to construct roads that are accessible by persons with disabilities.
- ✓ Have disability –related associations participate in planning and designs stages
- ✓ Use of Braille and clearly written symbols.
- ✓ Promote sign language use.

There are activities undertaken in relation to the UN Convention. The Convention has been translated into regional official language such as Amharic, Afan Oromo, Somali, and Tigrigna and disseminated to executive bodies and this greatly contributes to its effectiveness.

The Convention will play a great role in facilitating for conducive atmosphere for future implementation. The case of person living with disability is not something to be implemented by one body. There are so many and multi sectored actors in this affair. The consequences of the absence of the basic infrastructure affected negatively the social, economical, political and other aspects of person living with disabilities. However, in many instances, legislation has not yet been followed up with detailed regulatory frameworks, leading to very little implementation on the ground.

Road design manuals are a helpful tool for planners to design roads according to the latest Knowledge and to ensure consistent roads. Ethiopia has several guidelines, focusing on different fields of infrastructure construction. Accessibility is valued in the ERA document as an -indispensable part of the transport system in urban area. However, the actual parameters such as width and construction material. Footpaths, pedestrian bridges, cycle tracks and pedestrian islands are not set and dealt with in specified standards.

4.5.3 Proposed general framework for accessibility for PwDs in Addis Ababa City

When reviewing the discussion so far made on accessibility, a development of approaches can be showed by Fishbone diagram for causes, challenges and effects of accessibility of PwDs

In **Figure 4.72 below** .The pattern of development described by this framework applies perfectly to Ethiopia and Addis Ababa City in particular; yet, it could be helpful in describing the general trends observed.

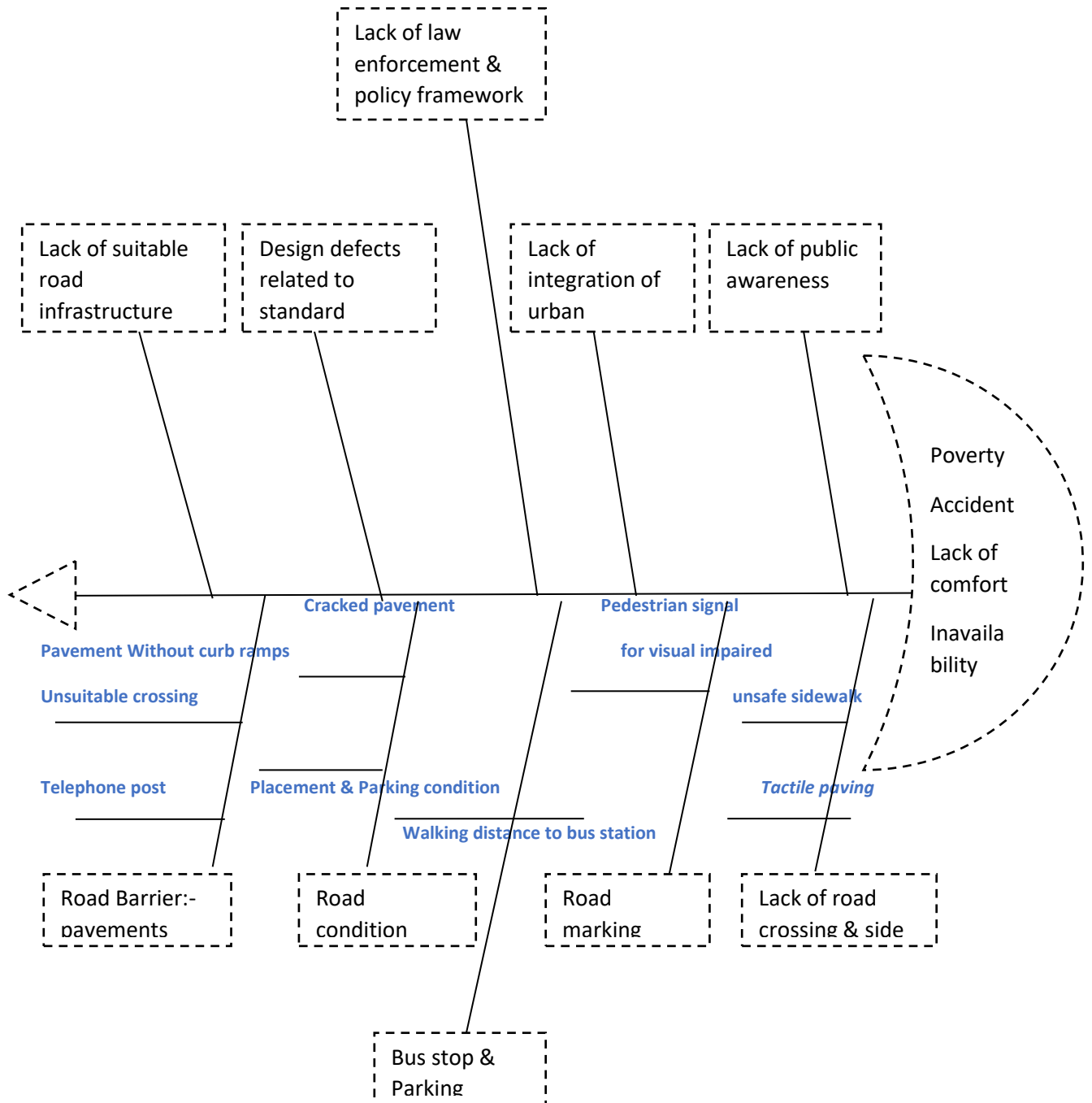


Figure 4. 72: Fishbone diagram for causes, challenges and effects of accessibility of PwDs

This is a good effort as input to develop a legal framework on which further action can be controlled. The detailed regulations and strategies should be developed and enforced to address particular mobility problems; these will include the development of an urban roads design manual, which among others should give specific standards for design of accessibility of road facilities. Ethiopia has particularly adopted national accessibility standards for buildings, but not for road transport. However the degree to which these standards are actually being followed is not always clear.

Strategic functions that need to be performed in ensuring good urban mobility can be divided into five categories: **Accessibility design guidelines, legal and policy enforcement, parking guiding system, integration between road infrastructures and built environment, and Active participation** of PwDs association. In setting up such categories, there are several questions that need to be answered. There are various accessibility elements under each option, so that each requires improvements to road facilities. For example the Accessibility Guidelines includes a pedestrian pathway which is the most common barriers to accessibility in Addis Ababa city. The first steps in providing adequate pedestrian facilities should therefore include:

- ✓ Prioritize the high pedestrian corridors for accessible Sidewalks.
- ✓ Surfacing footways with an all-weather material (asphalt or concrete) as a performance contract target with specific targets by the implementing agencies
- ✓ Installing kerb ramps where the footway crosses streets, driveways and so forth;
- ✓ Ensuring that street signs and street furniture are located to provide an adequate clear width and height that is continuous along the footway; and
- ✓ Ongoing enforcement to keep parked cars, vendors, and rubbish out of the clear width of the already existing infrastructure.

Of course this standard cannot be achieved everywhere at once at Addis Ababa City. But can start by taking the following steps:

- ✓ When doing regular maintenance, upgrading or construction of road sidewalks, ensure that accessibility guidelines are followed.
- ✓ Start by identifying high priority pedestrian routes used by many people (including many people with disabilities), for upgrading first.
- ✓ Providing a footway only on one side of the street and later completing the other side may be adequate as a start, although it is generally desirable to provide footways on both sides of streets used by pedestrians.

According to the study, generally the proposed improvement categories and its elements that can optimally be applied within the current policy and legislative frameworks for Addis Ababa city are outlined on the structure on **Figure 4.73** below:

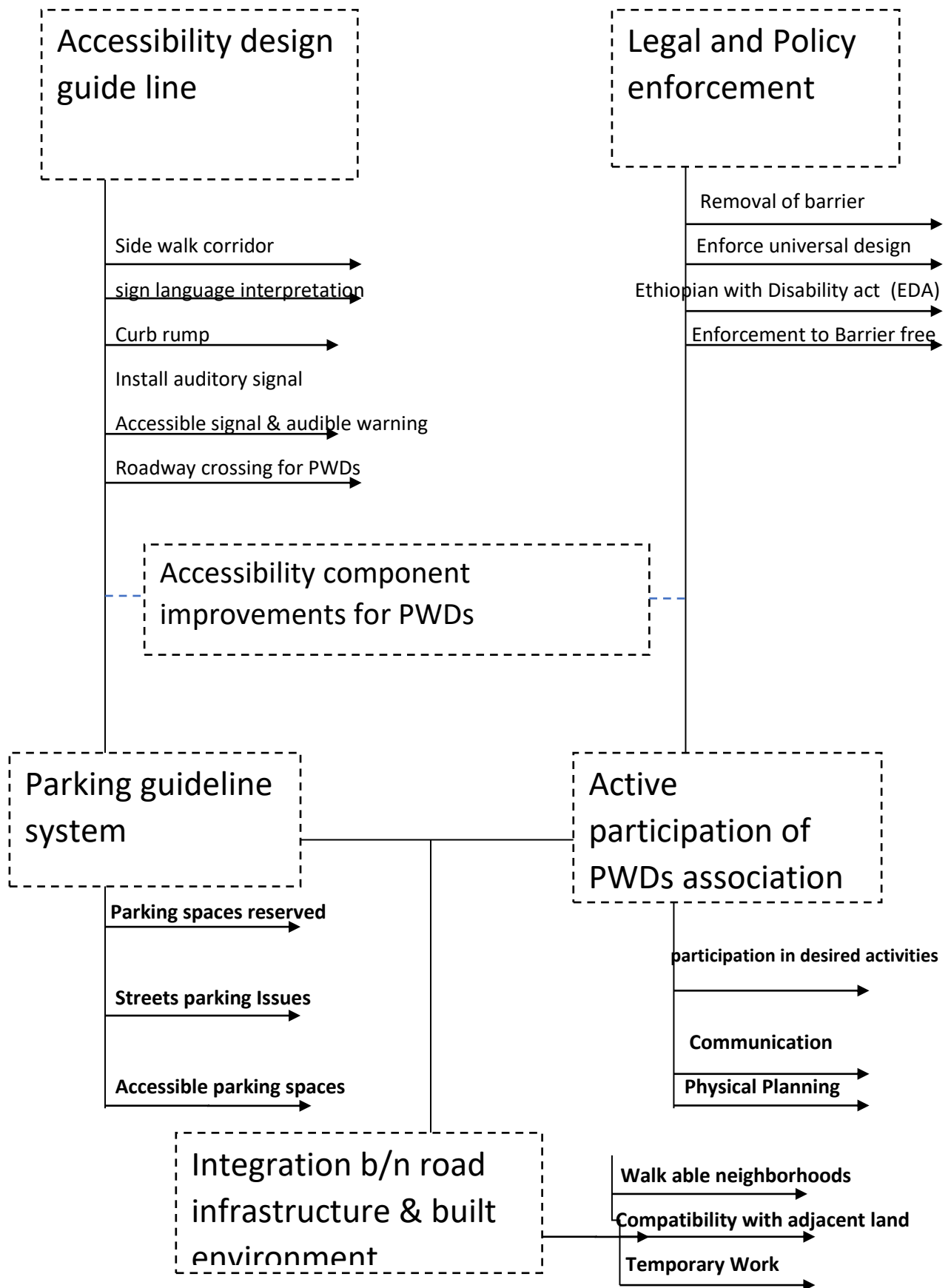


Figure 4. 73: Road Accessibility components to be improved

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The study objectives were to assess and analyze the accessibility of road infrastructure facilities for person with disabilities. So that challenges they face and barriers to transportation were identified. In this study the following major conclusion was drawn based on findings in line with each specific objective:

The existing accessibility of road transport environment in each sub city of Addis Ababa is not accessible, the study identified that 40 road segments were selection in Addis Ababa city as a whole. The distribution by sub-city shows road segments in Kirkos (5 segments), Bole (5 segments), Arada (5 segments) , Yeka (3 segments), Lideta (3 segments), Nifas-Silk/Lafto (4 segments), Addis-Ketema (4 segments), Akaki (4 segments), Kolfe(4 segments) and Gullele (3 segments) sub-cities respectively. The Road accessibility elements identified in each sub-city indicates the presence, condition and/or dimension of pedestrian sidewalk, curb cut, zebra crossing, disability parking space, traffic control signals and tactile surface. PwDs have also faced different kinds of challenges among that the road infrastructure facilities related problems such as Bus stops related problems (Such as placement and parking condition), Barriers such as telephone poles, solid waste and pavements without curb ramps, Poor Road Condition such as Cracked and dangerous pavements were the top three with respective score with relative important index 0.76, 0.75 and 0.73.

The major causes of poor accessibility in road transport environment for PwDs that were identified and analyzed were; Road Environmental Barrier and/or obstruction, Lack of suitable road Infrastructure provision and Road design Defects related to standards guideline were ranked from first to third with percentage RII value of 0.77, 0.74 and 0.73 respectively.

The lack of coordination between different offices and associations of person with disabilities contributed to poor implementation of transport policy. Moreover PwDs were not participant in the planning, design and implementation of an accessible transport system and were neither considered as stakeholders. They have no room in transportation office either to plan and implement the accessibility design in the city transport system.

For improving the accessibility of road there is standard to be achieved at Addis Ababa City. When doing regular maintenance, upgrading or construction of road sidewalks, ensure that accessibility guidelines are followed. Start by identifying high priority pedestrian routes used by many people (including many people with disabilities), for upgrading first; Providing a footway only on one side of the street and later completing the other side may be adequate as a start, although it is generally desirable to provide footways on both sides of streets used by pedestrians. As general in Addis Ababa, there is no road accessibility for person with disability (PWDs).It needs modification in maintenance period those should be accessible for PWDs.

5.2 Recommendations

Based on various related literature and study finding; the following measures are recommended to bring inclusive road transport system.

- ✓ The infrastructure should be accessible for PwDs: Sidewalks and paths should be properly paved, the lane should be separated; curb ramp should be designed for wheelchair users. Road obstructions should be removed, easily detectable by white cane, aligned along continuous line and The street should have proper street furniture such a bus stops, street lights, and a waiting areas.
- ✓ The control system should be accessible for PwDs ,such as the crossings should be accessible by providing raised pedestrian crossings, zebra crossing; the traffic light should have sound signal to make it more accessible for visual impaired ; the parking should have reserved parking and it should have signs of PwDs either in symbol or written.
- ✓ Appropriate administration measures should be taken at municipality level.
 - The city administration should emphasis on proper urban design and its implementation to provide free path, proper sidewalk, proper positioning of street furniture. The municipality should give emphasis to minimize the physical barriers to make the transportation environment more accessible for all.
 - The associations of person with disability should work together with transportation officials to improve the accessibility.
- ✓ The existing transport policy needs to be revised with participation by different stakeholders for ease of implementation.
 - The inclusion of international agreement related with person with disabilities.
 - Active participation of PwDs in policy formulation and implementation process.
 - Considering PwDs as a cross cutting issue in all organizations related to transport services; and Legal enforcement during planning ,design and constructions.

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APPENDIX 1: Field Survey

- The check list to ensure that accessibility is prepared for the critical location in each sub-cities of Addis Ababa with respect to the following road infrastructure facility problems for PwDs

Types of problems	Degree of problems @ _____ Sub-City _____ Streets			
	Very Critical	Critical	Partial	Not critical
Road Barriers such as pavement without curb ramps , telephones post, solid wastes and etc				
Road Conditions such as cracked pavements and unsafe sidewalks and etc				
Road Marking/ Furniture (e.g Pedestrian Signals for Visual Impaired)				
Road Crossing and Side Walks such as walking Distance to Bus station, unsuitable street crossing and etc				
Bus stops or parking Conditions such as placement and Parking Condition				

- This checklist seeks to outline the number, condition and dimension of selected road facilities in Addis Ababa.

Location : _____				
Road Accessibility Element	Variable	Availability	Condition	Dimension
	Pedestrian facility	Yes <input type="checkbox"/> No <input type="checkbox"/>	Poor <input type="checkbox"/> Good <input type="checkbox"/> Average <input type="checkbox"/>	Width:
	Walkway on side of the road	Yes <input type="checkbox"/> No <input type="checkbox"/>	One side <input type="checkbox"/> Both sides <input type="checkbox"/> Exclusive W <input type="checkbox"/> ay	Width:
	Curb cut	Yes <input type="checkbox"/> No <input type="checkbox"/>		Height:

	Topography of road facility	Yes <input type="checkbox"/> No <input type="checkbox"/>	flat <input type="checkbox"/> rolling <input type="checkbox"/> very steep <input type="checkbox"/>	Transverse Slope:
	Zebra Crossing	Yes <input type="checkbox"/> No <input type="checkbox"/>		Width:
	Tactile surface and signage	Yes <input type="checkbox"/> No <input type="checkbox"/>	Poor <input type="checkbox"/> Good <input type="checkbox"/> Average <input type="checkbox"/>	Width:
	Signage and other obstacles	Yes <input type="checkbox"/> No <input type="checkbox"/>		Distance from edge of the curbs : :
	Disability parking space	Yes <input type="checkbox"/> No <input type="checkbox"/>	Poor <input type="checkbox"/> Good <input type="checkbox"/> Average <input type="checkbox"/>	Width:
	Communication Tools Directional Signs	Yes <input type="checkbox"/> No <input type="checkbox"/>		
	Bus stop	Yes <input type="checkbox"/> No <input type="checkbox"/>		
	Curb Ramps at bus stop	Yes <input type="checkbox"/> No <input type="checkbox"/>		Height:

APPENDIX 2: The Questionnaire Survey

This questionnaire is prepared as part of a study to obtain necessary data to assess the accessibility of road infrastructure facilities for persons with disabilities in Addis Ababa City. In order to attain the stated objectives, collecting relevant and genuine data is highly significant.

So, dear respondents you are kindly requested to give the reliable and genuine information for the successful accomplishment of the study of this research project. Finally, I would like to assure you that all your responses will be kept confidential and used only for academic purpose.

Thank you in advance for your valuable cooperation!!

FORM 1: RESPONDENT DETAILS

Personal Information

1. Gender:

Male Female

2. Age :

Age in range (years)	tick (X or ✓)
Below 18 years old	
18-25 years old	
26-45 years old	
46-60 years old	
Over 60 years old	

3. Type of Disability

Type	Any More Detail if possible?
1. Physical	
2. Visual	

4. Employment

Employment Status	tick (X or ✓)
Employed	
Unemployed	
Retired	
Student	
Unpaid family worker	
Living with aid of relatives	
Getting aid from NGOs	
Getting aid from government	

Other, please specify: _____

5. Educational Status

Educational level	tick (X or ✓)
Read and Write only	
1-6	
6-9	
9-10	
10+1	
10+2	
Certificate	
Diploma	
BA/BSc Degree	
M.A /MSC Degree	

Other, please specify: _____

6. Living and/or Working Address

Address of Work	No./ Building Street	Sub city	Kebele
Address of Living	No./ Building Street	Sub city	Kebele

7. Do you have any disability Assistive device (To aid Mobility?)

Yes No

8. Which One and how do you use disability Assistive device?

Form 2: Accessibility challenges of road infrastructure facilities & Measures taken to minimize problems related to person with disability.

1. Can you tell me about your experience when going out and into your home about the barriers in transport environment?

.....

2. Below are some of the problems related to Infrastructure provision, Please respond to each item by kindly rating on the scale?

S.No.	Types of problems	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.	Cracked, and dangerous pavements					
2.	Difficult in crossing roads					
3.	Intersections without curb ramps					
4.	Unsuitable street crossing and					
5.	pedestrian signals					
6.	Barriers such as telephone poles, solid waste					

3. What specific types of challenges are experienced?

.....

4. Below are some of the problems related to Provision of road facilities, Please respond to each item by kindly rating on the scale?

S.No	Types of problems	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.	Using Zebra crossings					
2.	Cross any place in the street without any help					
3.	Lack of provision of parking space					
4.	Lack of wheelchair ramps					
5.	Audible information					
6.	Getting information about accessible transport					

Other, please specify _____

5. In your own opinion, what do you think can be done to solve these problems?

.....

6. What are the major causes of current road infrastructure problems? Please respond to each item by kindly rating on the scale?

Major causes of transport system problems	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Infrastructure provision					
Environmental Barriers					
Law Enforcement					
Public Awareness					

7. Factors that determine Status of Policy framework and/or standard guidelines that ensures the accessibility in light with PwDs. Please respond to each item by kindly rating on the scale?

Factors that determine Status of Policy Implementation	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Availability of policy framework and/or standard guidelines					
Implementation status of policy framework and/or standard guidelines					
Legal enforceability of the policy					

8. Are you aware of any policy frameworks and standard guidelines with regarding to the inclusion of PwDs in Road Infrastructure facilities?

Yes No

9. If yes, which one and in what context?

.....

Thank you for your response!

APPENDIX 3: Interview Guide for Public Institutions

I. To Addis Ababa Road and Transport Management Agency (AARTMA)

1. What are **policy frameworks** and/or **standard guidelines** that advocate for Accessibility in Ethiopia?
2. What role does your office play in this regard? If no, whose role is it?
3. Do you have any special consideration to the needs and interests of Persons with disability?
4. Is there any specification requiring the design of road infrastructure to be accessible for Person with Disabilities? If there is, what is it? If no, why not?
5. As AARTMA, what measures did your institution took so as to make the National Plan of Action for Person with Disabilities, especially concerning accessibility to be effective?

II. To A.A Municipality & AACRA office

1. Do you think that designs of road infrastructures in Addis Ababa City are accessible for Persons with Disabilities? If not, what measures your office did take/taking?
2. Do your designs consider mobility needs of Person with Disabilities, especially, for those with limited Physical and Visual impairments? If yes, in what way would it consider?
3. Would the design and its implementation conform?
4. What factors hinder constructing all inclusive roads? Is it costly to construct roads with full access to person with Disabilities?

APPENDIX 4: Interview Guide for Persons with Disability

1. How do you see the road Infrastructure (streets) in A.A City? Do you think they are accessible by Person with Disabilities?
2. Have you ever faced challenges in accessing road facilities in Addis Ababa? If yes, what are they? And, how frequent are these challenges?
3. What are the coping mechanisms have you used?
4. What should be done in relation with alleviating the problem, and improving the road accessibility in A.A City?

APPENDIX 5: Focus Group Discussion

1. What are the problems you face in the transport environment i.e. road Infrastructure in relation with using streets in Addis Ababa City?
2. What do you think is the cause(s) for the problem(s)?
3. What should be done with the existing and future transport environment so as to ensure the road facility access needs of Person with Disabilities?
4. If there is anything to add in relation with road Infrastructure accessibility before we conclude our discussion, you are welcome

APPENDIX 6: Research Photos



Figure 4. 74: Absence of sidewalk from Medhanialem Adebabayi to Mesalemiya in Addis Ketema Sub-Sub city



Figure 4. 75: Sidewalks barriers and improper pedestrian crossing from Gojem Berenda to John Church Addis Ketema



Figure 4. 76: Absence of curb ramp and tactile surface to Minilik square at Arada sub city.



Figure 4. 77: Absence of sidewalk and inaccessible sidewalk on Mesaltegna to Adeyababa road segments



Figure 4. 78: Road barriers such as poles and non mobility of wheel chairs from Bole Airport to Bole Micheal



Figure 4. 79: Pavement Curb cuts without ramps and unsecured tactile surface for visual impaired from Adisu Gebeya to Chilot Adebabyi in Gulele Subcity



Figure 4. 80: Trees, poles and inappropriate raised sidewalks from lideta to Tor hailoch Adebabyi



Figure 4. 81: In accessible sidewalk and sidewalk occupied by bejaj in Weyira betel to Keraniyo in kolfe keraniyo sub-city



Figure 4. 82: Inaccessible routes for wheelchair users and other PwDs



Figure 4. 83: Wrecked sidewalks and footpaths causing mobility difficulty for PwDs