Assessing the Value of Sidewalk Safety Attributes Affecting Individual's Walking Mode Choices Using a Choice Experiment Method in Amirabad Neighbourhood

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Abstract

Due to an increase in the urban population, metropolitan cities like Tehran, the capital of Iran, have encountered an uncontrolled vertical development and urban sprawl. The automobile-oriented approach has become an initial result of urban growth, which has a tremendous effect on health benefits and a significant decline in the physical activity of urban residents. Pedestrians are a segment of urban residents that are disproportionately vulnerable to a dramatic shift that has happened in both the physical and environmental aspects of urban areas. Consequently, such changes have had a negative influence on the walking mode choice and a decline in pedestrian safety in very conflicted zones, like pedestrian sidewalks. Most sidewalks have not been designed based on pedestrian priority and preferences which discourages residents from walking as a mode of travel. Broken walkways, narrow widths, and motor-vehicles parked illegally on sidewalks are some of the constraints for all urban residents. Therefore, an improvement of urban sidewalk features requires a thorough understanding of the perception of pedestrian safety as well as attributes that contribute in developing safe sidewalks in the city of Tehran. This research aims to identify and measure the physical and operational attributes of safe sidewalks affecting resident's preference for constructing a pleasant sidewalk.

Data is partially collected from a focus group study in the proposed study area to determine residents' perceptions regarding the main attributes of sidewalk's safety. In this study, Choice Experiment (CE) methodology has been implemented to examine and measure residents' preferences for sidewalk safety attributes. To quantify the environmental and physical values and their importances, the study was performed on 95 sample population. They were recruited for a CE study in which they had to choose between a number of sidewalks that differed in terms of

lighting, width, curb and bollards (metal barriers), evenness and city cost for a square meter. The result from the CE study has shown that the average resident preferred a sidewalk with an adequate lighting and brightness. Sidewalk width and sidewalk leveling were the second and third priorities of Amirabad residents.

Key Words: Sidewalk Safety, Choice Experiment, Sidewalk Attributes, Walking Transportation Mode, Amirabad Neighbourhood

Foreword

The quality of pedestrian infrastructures promotes a notion of the sustainable walkable city. Most of the sustainable cities in the world consider a pedestrian-oriented initiative as the primary focus in a planning agenda which addresses the accessibility, safety, connectivity, continuity, and affordability of urban residents. Although cities have been built mostly based on pedestrian-oriented approaches, in recent decades due to urban growth, modernization, automobile dependency, and urban sprawl many developing countries like Iran have struggled and faced significant issues, including traffic congestion, air pollution, obesity and heart diseases.

Implementation of large-scale planning design for pedestrians would not be an easy practical approach, particularly in developing countries, due to financial limitation and lack of appropriate management. However, undoubtedly, focus on sidewalk implementation would improve and develop pedestrian features that can play a critical role in attracting urban spaces for pedestrian and also an increase of urban residents physical activity. Sidewalks have become one of the most

important urban pedestrian spaces which in recent decades have been ignored and not properly constructed due to lack of attention by the city by-laws and policies.

Planning for a sustainable walkable city entails an understanding of urban residents' constraints in walking and routine physical activity within urban spaces. According to my plan of study, public consultation was the most significant component of the study that contributed extensively to understand how appropriate city planning is affected by the role of this component. This contributes significantly to understanding the factors that affect development and design of the sidewalks in Tehran throughout the public consultation and bringing the voice of urban residents into account. Thus, improvement and development of sidewalks can tremendously encourage people to choose walking as a primary mode of transportation in urban areas.

This research paper is designed in five chapters. Chapter 1 provides a detailed overview of the research scope. The first section of this chapter, section 1.1 discusses research objectives. Section 1.2, concerns research questions on walking transportation mode, and section 1.3 provides a detailed overview of the study area in Tehran, Iran.

Chapter 2 of this paper gives a detailed overview of previous literature and articles. Section 2.1 summarizes previous studies concerning the walking transportation mode, and factors that might affect the amount of walking and physical activity of urban residents. Section 2.2 of this chapter provides an overview of sidewalk characteristics and some of the sidewalk features that impact on the safety of sidewalks.

Chapter 3 gives a detailed overview of the methodology used for collecting data and information from Amirabad residents in Tehran. Section 3.1 of this chapter describes choice experiment design theory and its origins. Focus group discussion and results collected from the focus group discussion are summarized in section 3.2. In section 3.3, a detailed description of

survey questionnaire design is explained. And finally, section 3.4 provides a Choice Experiment design and demonstrates a summary of choice cards used for a CE design.

Analysis and findings in chapter 4 provides and describes data obtained from the CE design, demographic and survey questions. A detailed discussion of CE results and findings is provided in this section as well. Finally, chapter 5 provides a conclusion obtained from the overall research findings, discussions, and results.

1.Introduction

Walking is one of the simplest, least expensive and most used types of human transportation, which is usually possible for short distance routes within the city without any dependence on any other type of transportation. Walking on a large scale has a significant impact on the health benefits of individuals, and plays an important role in minimizing the outcomes stemming from a domination of automobile dependency in highly urbanized areas and the cost related to the healthcare system. From the economic and environmental perspectives, problems associated with traffic congestion, greenhouse gases and urban sprawl can be significantly decreased when residents choose to walk rather than take motor-vehicle trips, and also reduce the risk of obesity and related issues to air pollution such as asthma, respiratory, pulmonary and heart diseases.

By expansion of urban areas and uncontrolled growth of megacities due to increases of population and the extensive emergence of motor-vehicles, the structure of the city has been confronted by significant land use changes and urban land scarce for new developments. With the negative effects of automobile domination in the late 1960s, pioneer cities (European cities and then in the United States) legislated a pedestrian master plan, leading to the creation of full pedestrian networks, which is an important indicator of urban development (Mofidi & Kashani Jou, 2010). A pedestrian master plan key idea was to advocate for compact and integrated urban development that addresses a pedestrian oriented approach. Such approaches are known as “Compact Cities”, “New Urbanism”, and “Smart Growth” (Shoorcheh, Varesi, Mohammadi, & Litman, 2016; Mofidi & Kashani Jou, 2010; Perrotta, Campbell, Chirrey, Frank, & Chapman, 2012; Rocchi & Bathurst, 2009).

Despite this, in many developing countries like Iran, an automobile-oriented approach is still the dominant one, while the development of pedestrianisation has been dramatically neglected and has encountered several difficulties. Statistics show that 30% of people who are killed in accidents are pedestrians (Daneshpour, Mahmoudi, & Abbasi, 2013). Thus, pedestrian safety is one of the major concerns that has been neglected in an urban planning process and is considered as the main barrier for discouraging Tehran's residents to walk. However, Moeini (2015) suggested that physical activity (such as at least half an hour walking) has a significant impact on reducing obesity, heart diseases and strokes. Analysis of pedestrian fatalities is crucial in understanding the factors contributing to endangering pedestrian safety.

A walkable neighbourhood is a significant component of a sustainable city that facilitates prosperity for its residents by being inclusive and supportive of the diverse expectations of urban residents (Perrotta et al., 2012). Developing a safe, accessible, convenient, comfortable, and attractive neighbourhood can encourage people to shift toward a more pedestrian-oriented approach (Rocchi & Bathurst, 2009). Moreover, Jeff Speck (2012) in *walkable cities* "promotes walking as the one key factor of a thriving city, presenting it as a simple, practical-minded solution to many of the complex problems that undermine environmental sustainability" (p.11). Hence, improvement of sidewalks and streets with the aim of organizing, facilitating traffic and increasing public safety should be the main priority in the planning agenda of highly urbanized areas.

Improving the current conditions of sidewalk quality by using robust materials and implementing sustainable designs are among the long-term goals of the comprehensive plan of Tehran (Moeini, 2015). In this plan, all residents, including children, youth, and the elderly people, as well as the physically disabled are able to equally use the natural and physical resources of the neighbourhood. The overall affect of a comprehensive implementation plan is to increase the

choice of walking mode as a means of transportation for short distances and the use of public transport rather than relying on motor-vehicles. Moeini (2015) further asserted that a comprehensive implementation plan significantly deals with safety, security, network integrity, environmental sustainability, livability, and attractive environment in its principles. This is based on a general belief that full implementation of these projects in the city, improves the quality of urban environment and people's health, security, and furthermore, the development of sustainable cities will be enhanced.

This type of research is difficult to conduct due to lack of adequate research and study in Iran. Overall, the previous studies mainly focused on walking mode choice behaviours on specific population age groups, and research on the influence of urban sprawl on travel choices of residents remained limited. On the other hand, choosing attributes influencing walking is extremely important while designing a choice experiment. Furthermore, it has been suggested to limit the scope of my study to a safety component of the walkable city with certain attributes that have been chosen by my focus group study in Tehran.

1.1. Research Objective

Overall, the intention and goal of this project is assessing the value of the sidewalk's safety attributes affecting the individual's walking mode choices using a Choice Experiment method in Amirabad neighbourhood. For an in-depth understanding of a walking mode choice, this study attempted to find out whether there is an association between walking mode choice with some of the demographic characteristics of neighbourhood residents. In working toward this goal, socio-demographic characteristics and pedestrian perceptions on sidewalk safety attributes have been identified and analyzed through conducting a focus group study. Based on data collected from a

focus group discussion, a survey questionnaire was designed and distributed among Amirabad residents.

The Choice Experiment method was implemented in this research project. The objective is to deliver a qualitative and quantitative analysis of the sidewalk safety attributes in Amirabad neighbourhood. Understanding and evaluating of important factors that play a key role in enhancing sidewalk safety can help to prioritize residents' needs and incorporate them into the urban planning agenda. Therefore, improvements in current conditions of Tehran's sidewalk attributes can lead to an increase of residents' incentives for physical activity and walking behaviors, as well as being a great help in health benefits of residents.

1.2. Research Questions

My research intends to investigate the attributes that people place on sidewalk design and elements. In particular:

• What are the key attributes of a walkable sidewalk from residents' perceptions in major urban centers?

• Are walking behaviors associated with characteristics of the built environment in large urban centers like Tehran?

• What socio-demographic factors contribute to individuals' preferences for sidewalk attributes?

• How can changing the physical elements of the sidewalk contribute effectively in encouraging people to be more physically active in their daily routines?

1.3. Study Area

Tehran metropolitan, located in Northwestern Iran (Fig. 1), is the most populated city, and capital of the country, with 22 urban districts (Fig. 2) (each district has its own municipality).

Figure 1 Map of Iran, Tehran
Source: Iran political map, n.d. http://www.emapsworld.com/iran-political-map.html)

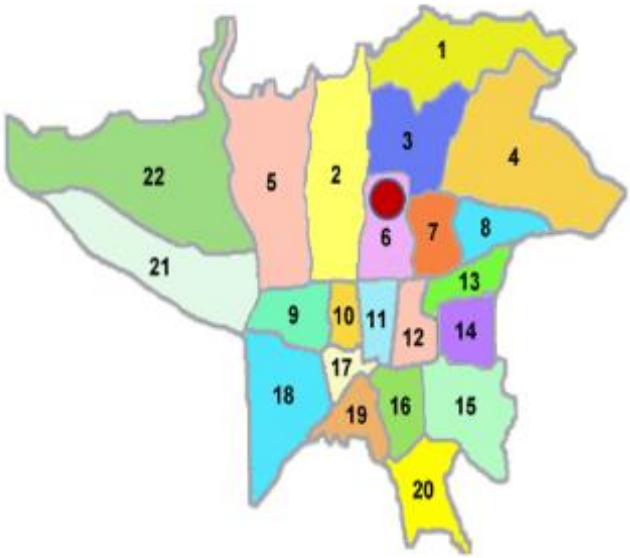

Figure 2 Map of Tehran's Districts
Source: Tehran Municipality, 2017 http://en.Tehran.ir/default.aspx?tabid=88

Tehran with 8.8 million inhabitants and 730 km^2 has faced a dramatic urban growth. From 1950 to 2017 Tehran has experienced population growth from 1,041,000 to 8,604,000 due to increased centralization and domestic immigration (Fig. 3) (World population review, n.d.).

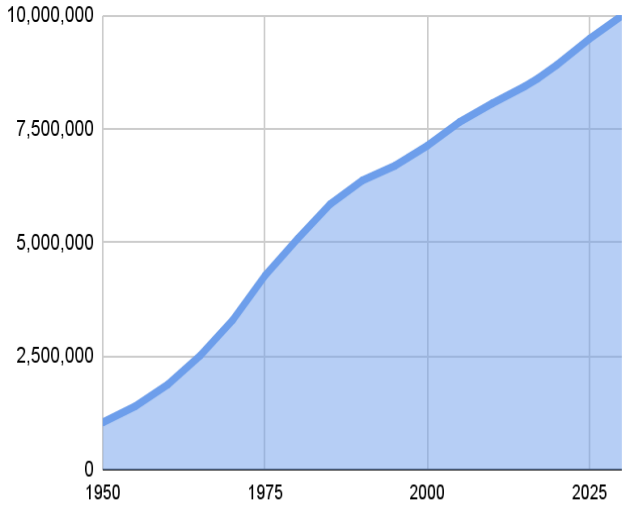

Figure 3 Tehran Population Growth (1950-2030)
Source: author's work with base data source from World population review, n.d. http://worldpopulationreview.com/

District 6 is one of the old districts of the city that geographically is situated approximately in the central part of the city. It is composed of 6 regions and 18 neighbourhoods, with a population of 251,384, and occupies an area of 2138.45 hectares, 3.3% of Tehran metropolis (Tehran Municipality, 2017). District 6 as a multifunctional urban space hosts the most important economical, social and political organizations and governmental institutions in terms of building density it ranks in first place in the city of Tehran. District 6 is comprised of 35% residential area; 30% administrative, commercial, and educational; and 30% dedicated to the transport network. This region with a density of 98% constructed spaces turned out to be one of the compact urban spaces with a land use mix design that focused only on vertical development (Region 6 Tehran municipality, 2017). Amirabad neighbourhood is known as one of the main regions with a population of 65,000. Figure 4 illustrates the layout of Amirabad neighbourhood in the plan of district 6. The study area from the three directions of east, west, and north is limited to three main highways of Koredestan, Chamran and Hemmat and in the south to Shahid Gomnam Street, respectively.

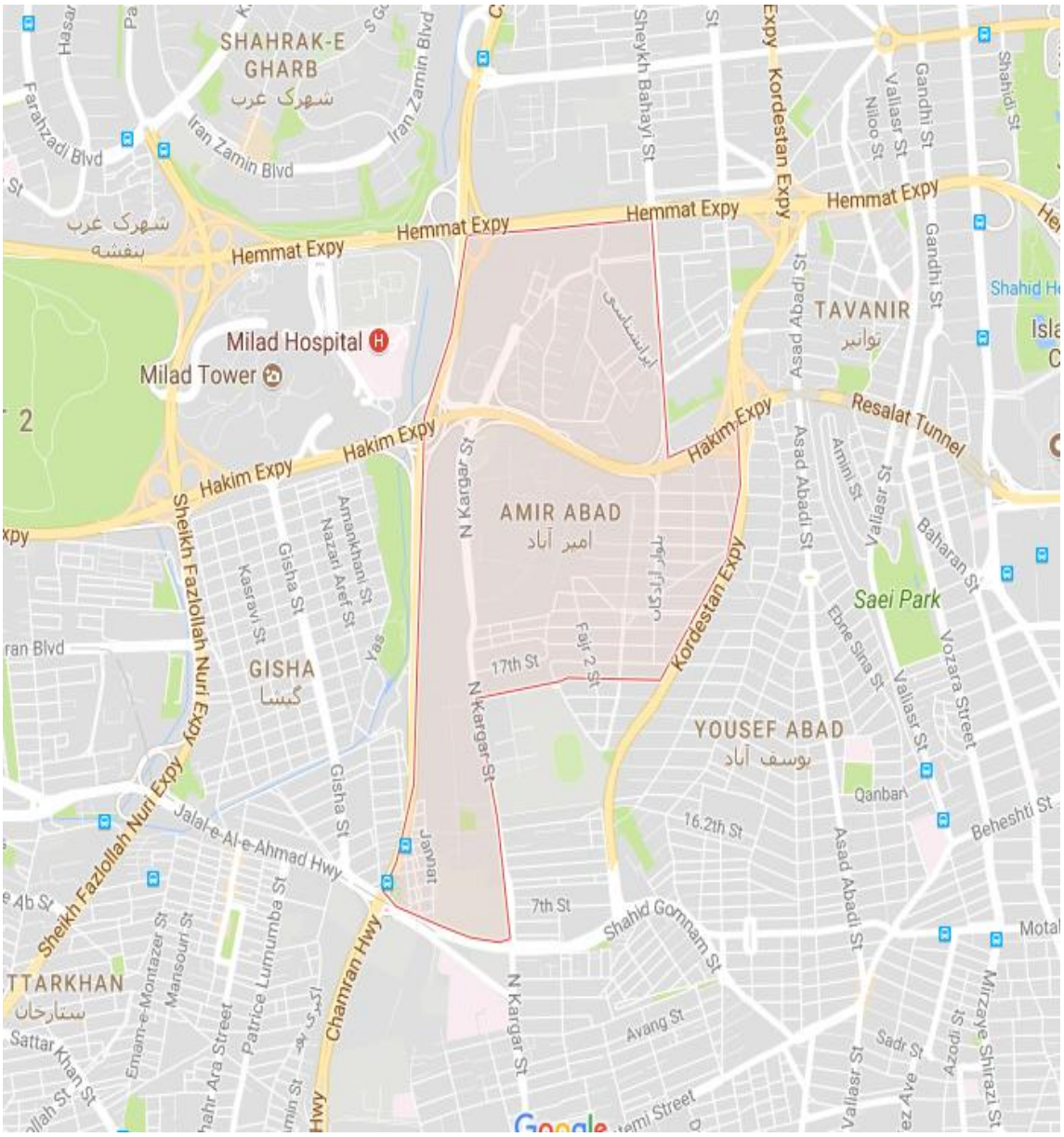

Figure 4 Amirabad, District 6, Tehran Province, Iran
Source: Google map

Amirabad is highly recognizable with Kargar Street (Fig. 5) as one of the longest streets of the city which serves thousands of Tehran's inhabitants, due to the multitude of official organizations and university campuses located nearby. Indeed, Amirabad neighbourhood is a great example of shared space that is accessible by public transportation, private vehicles and pedestrians.

Figure 5 Kargar Street in District 6, Tehran
Source: asemanhome, 2017 http://asemanhome.com/

The gradual domination of cars on urban spaces has resulted in a loss of connection between human settlements and sustainable urban planning and consequently a continuation of this trend has led to the threatening of urban residents. Therefore, to correct this trend it is necessary for both management and implementation to work together.

2.Literature Review & Background

A review of some literature and articles was carried out in this research to determine the association of walking behaviours with surrounding neighbourhood characteristics. A comprehensive review was sought on the walking transportation mode in section 1 of this chapter. This section provides detailed factors including built, natural and psychological factors affecting the amount of walking and physical activity of urban residents. This section addresses the impact of socio-economic status, education attainment and land use pattern on the walking level of residents as well. Section 2.2 sheds light on the review of sidewalk characteristics. And because the main scope of this research project is about valuing sidewalk characteristics, section 2.2 of this chapter has been dedicated to the review of sidewalk safety characteristics.

2.1. Walking Transportation Mode Research Review

In recent decades, the perspectives of walkable communities have been expanded due to the changes in urban residents' viewpoint. Studies show that there are strong relationships between the physical movement levels and neighbourhood design characteristics that are more or less enriched with sustainable walkable features, including a greater connectivity, accessibility, safety, and aesthetically designed characteristics of surrounding neighbourhood (Kaczynski & Sharratt, 2010). Due to the relatively permanent effects of the surrounding built environment on the level of physical activity, and the citizens having access to a variety of destinations within a walking distances, substantial changes in the built environment scale must be incorporated by adapting policies that support residents' perceptions and motives (Kaczynski & Sharratt, 2010; Cauwenberg, ourdeaudhuij, Clarys, Nasar, Salmon,Goubert, & Deforche, 2016). Since walking is

capable of enhancing social, economic, and cultural conditions in a society, a great deal of efforts have been recently made to improve public places, particularly sidewalks (Shafabakhsh & Mohammadi, 2014). Therefore, it is important to note that sidewalk improvement in particular can play a significant role in encouraging people to choose walking rather than relying on private cars due to the inconsistency or inappropriate conditions of sidewalks.

2.1.1 Built Environment

A sustainable walkable city is an approach framed in recent years, aimed to improve pedestrian infrastructures along with creating a land-use mix design that is more accessible for all urban users. Walking is the simplest mode of transport, within a comprehensive urban development approach (Mofidi & Kashani Jou, 2010, p.121), recommendable for the city center, especially for a city center with continuous increase of traffic congestion, gas costs, environmental concerns, poor air quality and the feeling of "lack of belonging" in the cities (Sukhbaata & Harada, 2011). As the car becomes more dominant, the incentives to increase walking and physical activity have been diminished due to the unplanned expansion of the city pattern and a growth of urban sprawl. This shift has threatened the notion of the walkable city in a way that fewer people tend to walk for utilitarian purposes or walk for the purpose of physical activity. According to Ariffin and Zahari (2013), the term "walkability" means how friendly an area is to walking, and to what extent the quality of pedestrian facilities, roadway conditions, land use patterns, community support, security, and comfort is taken into account while designing a sustainable walkable neighborhood. There have been various attempts in the history of urban planning in the city of Tehran to understand how these needs and motives can be implemented on the basis of several planning paradigms. The history of comprehensive urban planning dates back to the 1960s. The first

comprehensive plan in Tehran was generally considered to be a large-scale program to manage the growth of Tehran and formulate land use planning for 20 to 25 years. "A new comprehensive plan in 1968 proposed by the joint Iranian and American associations, aimed at changing the physical, social, and economic dimension of the city" and also it emerged to formulate a strategy to eliminate the consequences of such urban development (Akhavan & Behbahani, 2013, p.3). A comprehensive plan in Tehran was formulated to recognize and discuss issues that revolved around high density, pollution, inefficient infrastructure, construction regulations (e.g. selling zoning variance), city transport networks and particularly an automobile-oriented priority. On the other hand, pedestrian safety, environmental quality, urban landscape, and most importantly, integrated pedestrian access network, coherence and pedestrian comfort were increasingly underestimated and neglected (Moeini, 2015).

Furthermore, due to the deficiencies of the comprehensive plan and the overemphasizing of the framework dimension of the plan, the need for a strategic planning approach (vision for Tehran 2025) has been innovated to minimize the outcome of the city growth and strengthening of social, economic, and cultural aspects of the walkable city (Akhavan & Behbahani, 2013, p.4). Tehran's Vision 2025 considers an integrated transportation system and a pedestrian-oriented approach that is comfortable, accessible and safe for all urban users. The previous studies highlighted that during last century, Tehran experienced three main phases of *infrastructure design and development, land use regulation,* and *policy development* in which they mainly addressed the issues of rising figures in population, modernization and the emergence of motor-vehicles (Madanipour, 2006; Akhavan & Behbahani, 2013).

Several previous studies examined the concept of the new urbanism movement. New urbanism has been defined as a multidisciplinary approach dedicated to preserving a community's

built legacy while reconfiguring sprawling suburbs into a compact city that is pedestrian-oriented (Institute of Transportation Engineers, 2010). In other words, the main vision of the new urbanism is to provide a safe, comfortable, and convenient pedestrian infrastructure with an efficient transportation system whose emphasis is on the mental and physical health of all urban residents (Zarghami, AzhdehFar, & Toodeh Fallah, 2015).

Jane Jacobs (1961), as an urban activist, in her book "*The death and life of great American cities*" emphatically points out the necessity of an accessible and safe neighbourhood and "an intricate and close-grained diversity of uses that give each other constant mutual support, both economically and socially" (p.14). European cities such as Venice and Copenhagen are considered the greatest examples of pedestrian cities in the world with the complete, most varied and beautiful continuous urban fabric that offer a full range of services as well as social interactions within walking distance of all residents (Pedestrian Cities, n.d., par. 3). It is important to note that implementation of urban strategies entail an integrated and inclusive policy to address all urban users as well as neighbourhoods with insufficient physical infrastructure resources.

Furthermore, some reports shed light on the recent initiatives of *Complete Streets* that emerged in 2000 in major cities of the United States like New York City, Chicago, San Francisco and Boston in which they described to re-invent their city environment from an auto-oriented to a more complete streets oriented, and also, to bring vitality and social connectivity to their neighbourhoods (Moeini, 2015; Toronto Public Health, 2014, p. 2). Complete Street oriented design has been designed to minimize the potential conflicts of all urban users including pedestrians, disabled persons, public and private motor-vehicle users, bicycles and elderly people (Moeini, 2015; Perrotta et al, 2012).

"A *Complete Streets* policy creates a routine process for providing for all travel modes to ensure that roads and streets are routinely designed and operated to provide the safest achievable access for all users, including motorists, bicyclists, pedestrians and transit riders" (Institute of Transportation Engineers, 2010, p.15). Thus, reforming of street design policies with existing policies in an integrated development context can influence enhancing traffic and pedestrian safety, physical activity and a significant changes in built environment design.

Toronto Public Health (2014) further indicated that *Complete Streets* was beneficial from a pedestrian safety perspective and walkability point of view, aimed at providing a safe and pleasant experience for the most vulnerable users throughout the installation or improvement of pedestrian physical infrastructure, including lighting, sidewalk width improvement, sidewalk evenness and installation of bollards for separating pedestrian from vehicle roadways.

Although the idea of Complete Streets aims to mitigate certain complexities of the cities such as a rise in obesity, the rise in suburban sprawl, and inclination pedestrian-oriented approach, the implementation of such policies must be consistently formulated and regulated for all urban neighbourhoods. Sadler (n.d.) in his report, '*Complete streets make healthier people: Reforming street design policies to combat obesity'* argues that "despite the success of Complete Streets in United States and the widespread adoption of Complete Streets policies around the country, there is a lack of uniformity among these policies and numerous struggles with implementation. Some address all streets and all users, while others only apply to certain users, certain types of streets, and/or certain types of funding sources" (p.11).

As mentioned earlier, investment in sustainable city approaches entails an integrated city jurisdiction and policy as well as sufficient financial budgets in order to plan for a long term sustainable planning that considers all urban users. Accordingly, some studies shed light on the

current pedestrian safety issues of Tehran residents that increasingly resulted from a strict conflict between multidisciplinary systems in Tehran (Heidari Kani, 2015), and, most importantly, "the timely delivery of this visionary plan has been hampered due to avoidable financing issues" (Allen, 2013, p.19). Moreover, another study highlighted that management issues are to be considered as major obstacles in Tehran to developing pedestrian areas. Although Tehran is amongst well-developed cities and has viable geographical, physical, social and economic characteristics, due to management issues and irresponsible authorities it has turned into one of the less pedestrian-oriented capitals in the regions (Mofidi & kashani Jou, 2010; Heidari Kani, 2015).

There are some great and successful examples of walkable cities that have increased the livability of the city by promoting built environment opportunities for creating a sustainable walkable city. In 2000, the city of Seoul in South Korea turned an old highway overpass into a walkable path for pedestrians. Peters (2015) stated that "by converting the infrastructure into a pedestrian zone, Seoul is trying to reclaim the pedestrian quality of the city. While the project draws inevitable comparisons to the High Line in New York which acts more like a leisurely park, Seoul's Skygarden in one of the largest Asian mega cities will serve more as everyday transportation infrastructure". Rezoning and planning for the development of friendly pedestrian paths, particularly in areas like inner cities with high activity concentration and density, can reduce greenhouse gases within the city centre. On the other hand, it creates more opportunities to promote a land use mix design with a more accessible, safe, and livable city fabric that addresses a wide range of users.

Many studies investigated the influence of other factors associated with built environment and walking attitudes. Characteristics of the built environment and availability of the walking infrastructure are among the most important determinants of the walkable city and increase of

residents' physical activity. Various research has suggested that micro-scale environmental factors such as sidewalk characteristics, are extremely important for neighbourhood residents, particularly vulnerable urban users (Cauwenberg et al., 2016). The importance of certain micro-scale environmental factors for the level and purpose of walking (e.g. transport walking, walking for errands, or physical activity) might differ between subgroups of population (based on socio-demographic and functional characteristics) (Cauwenberg et al., 2016).

2.1.2. Natural Environment

Several studies have shown that the natural environment is a significant contributing factor in the level of walking and physical activity of residents. The results by Ariffin and Zahari (2013) concerning the impact of weather variables and total precipitation on the amount of walking. They indicated that increasing walking as a mode of transport might be difficult to achieve in climates with serious air quality problems and temperature inversion. According to Zebardast and Riazi (2013), there is a meaningful relationship between the level of walking and concentration of air pollution in different parts of the city. The results from this study has shown that increase of walking relatively reduces the concentration of air pollutants. In addition, neighbourhoods with a high concentration of pollutants and less walkability level are more likely farther away from a city centre. Consequently, it has resulted in obesity and less physical activity of residents who are living in urban sprawl compared to those who live in a city centre. Another study found that "examining weather variables allow policy makers to understand whether the built environment can make a difference in cities where there are extreme weather condition (Clark, Scott, & Yiannakoulias, 2013, p.327).

2.1.3. Psychological Factors

Psychological and behavioural factors are one of the significant factors in this issue that have been found in several studies. However, the number of findings are limited to discovering different aspects of psychological factors in perceiving physical activity and health benefits of residents. Some studies have found that attitudinal indicators such as comfort, convenience, and flexibility; and behavioural indicators such as safety and environmental concerns strongly impact on the travel mode choice of residents (Johansson, Heldt, & Johansson, 2006). It is important to note that this study has not emphasized whether these attitudinal factors contribute directly or indirectly to the travel mode choice of residents, like the level of walking, bicycle use, transportation etc. Social norms and cultural factors are associated with levels of walking. As such, many parents for the comfort and convenience of themselves intend to drop-off their children to school by private cars for short distances rather than walking daily. Unintended behavioural attitudes by parents gradually may impact on the level of physical activity of their children in adulthood.

2.1.4. Socio-Economic Status (SES)

Besides the built and natural environmental factors, there are other factors that associated with the socio-economic status of residents. It is important to note that there is no consistent conclusion among the findings from previous studies about the relationship between travel choices and socio-economic status of individual households. According to the recent studies, "individual economic status contributed to the patterns of walking behavior which differences may merely reflect variation in a person's motivation for physical activity" (Hearst, Sirard, Forsyth, Parker, Klein, Green, & Lytle, 2013, p.7). This study also found that households with lower individual-

level income relatively walk less and also have less total walking if transportation walking is not occurring. It is also important to note that "transportation walking is related to complicated processes such as personal preferences, social environment, and design and destination features, walking at work, and the management of household demands according to household types" (p.8). In contrast, other studies have shown that people in the lower income groups were more likely interested in walking which is apparently due to the result of socio-economic constraints (Langston, 2016).

Lower incomes tend to be more influenced by the price of transport, lower mobility levels, and having less access to cars (Hollevoet, Witte, & Macharis, 2011). Moreover, individuals with lower incomes walk more as a form of transportation, and somewhat unexpectedly, leisure walking was higher in the most disadvantaged neighborhood compared to the most advantaged. Due to such gap, less affluent populations are exposed to environmental risks such as dampness and traffic pollution related diseases, etc. (Hearst et al., 2013; Salvador, Reis, & Florindo, 2010). Furthermore, McMahon, Duncan, Stewart, Zegeer, and Khattak (2002) have found that "children of minorities and low-income families tend to be disproportionately represented in groups especially prone to pedestrian/motor vehicle crashes and injuries" (p.2).

A recent review indicated that irrespective of individual socio-economic status background, the level of walking for transport may decline as people age. The inclination of walking for transport is tremendously steep for some socio-economically disadvantaged urban residents, possibly as a result of their poorer health and functioning in old age (Turrell, Hewitt, Haynes, Nathan, & Giles-Corti, 2014). Overall, the level of walking is not strongly associated with individual's income level; it relies more on lifestyle of the individuals. In other words, the close

accessibility of destinations do not really matter for individuals who have tendency to use only motor-vehicle as a travel mode choice.

2.1.5. Education

The influence of educational attainment and the levels of walking are uncertain. However, other studies predicted these associations may vary by education levels (Droomers, Schrijvers, & Mackenbach, 2001; Shaw & Spokane, 2008; Kubzansky, Berkman, Glass, & Seeman, 1998). The study found that the level of walking for individuals with lower education increases as employed, whereas, this may vary for individuals with highly educated attainments, as being employed reduces their physical activity. Consequently, individuals with high-education are at higher risk of health problems due to a reduction of physical activity (Shaw & Spokane, 2008). In contrast, the investigations additionally have demonstrated that adverse changes in physical activity among lower-educated groups were more frequent due to a low perceived control in decreasing physical activity.

In addition, it has been predicted that educational differences among the low-educated younger groups are associated with family responsibility and for low-educated age groups is associated with financial and housing issues. It is an unfortunate that low-educated groups are four times more likely to experience decreases in physical activity compared with the highest educational group, which is consistent with the theory of cumulative advantage, suggesting that the benefits of education in promoting a physically active lifestyle accumulate and grow (Droomers et al., 2001; Shaw & Spokane, 2008). Further, other studies suggest that low levels of education were associated with a broad array of poorer psychological function, less optimal health

behaviors, poorer biological conditions, and increased body mass index ratio (Kubzansky et al., 1998).

2.1.6. Land Use Pattern

Urban design and planning interventions deliver the greatest health benefit when they encourage individuals to increase their physical activity. Likewise, a number of studies have demonstrated that the main features of neighbourhood design such as population density, employment density, land use mix, and street design have all been associated with the walking habits of residents and increased level of the physical activity. However, apparently, these neighbourhood features are not related to walking for the purpose of physical activity, they seem to be strongly related to utilitarian walking (Perrotta et al., 2012, p. 2). On the other hand, Hearst et al. (2013) suggest that there is evidence of a relationship between the level of walking and land use mix. There is less chance of being physically active and walk specifically for the purposes of health benefits in the most disadvantaged neighbourhoods compared to the least disadvantaged neighbourhoods. The time spent walking for transportation in disadvantaged neighbourhoods increases due to some socio-demographic characteristics of individuals as well as land use mix design (Hearst et al., 2013). The study demonstrated that in high versus low walkable neighbourhoods the amount and strength of walking for transport is higher due to land use mix design of neighbourhood (Christian, Bull, Middleton, Knuiman, Divitini, Hooper, Amarasinghe, & Giles-Corti, 2011). It is evident that constant connection of people with their urban spaces widely influences travel modes choices and level of daily activities. The study has shown that some characteristics of urban design such as land-use mix, diversity of uses, residential density and

pedestrian infrastructure to some extent can affect residents' travel choices (Ariffin & Zahari, 2013). However, the level of walking is not only limited to the pedestrian physical infrastructure of urban design. There are other factors that will be discussed in the next section.

According to Moeini (2015), about 25% of the 730 square kilometers of Tehran's area has been dedicated to the road networks. Indeed, levels of the road network for motor-vehicles and public transport are considerably higher than the levels of walking networks. Moeini (2015) in *Walkable Cities* demonstrated the prioritization of travel choices in two different pyramids (Fig. 6). The figures demonstrate the current condition in Tehran and the international satisfactory condition of travel choices. In current condition pyramid, pedestrians are located at the lowest part of the pyramid with less importance compared with other travel choices. In contrast, the satisfactory condition pyramid has dedicated pedestrianisation as a primary mode of transportation.

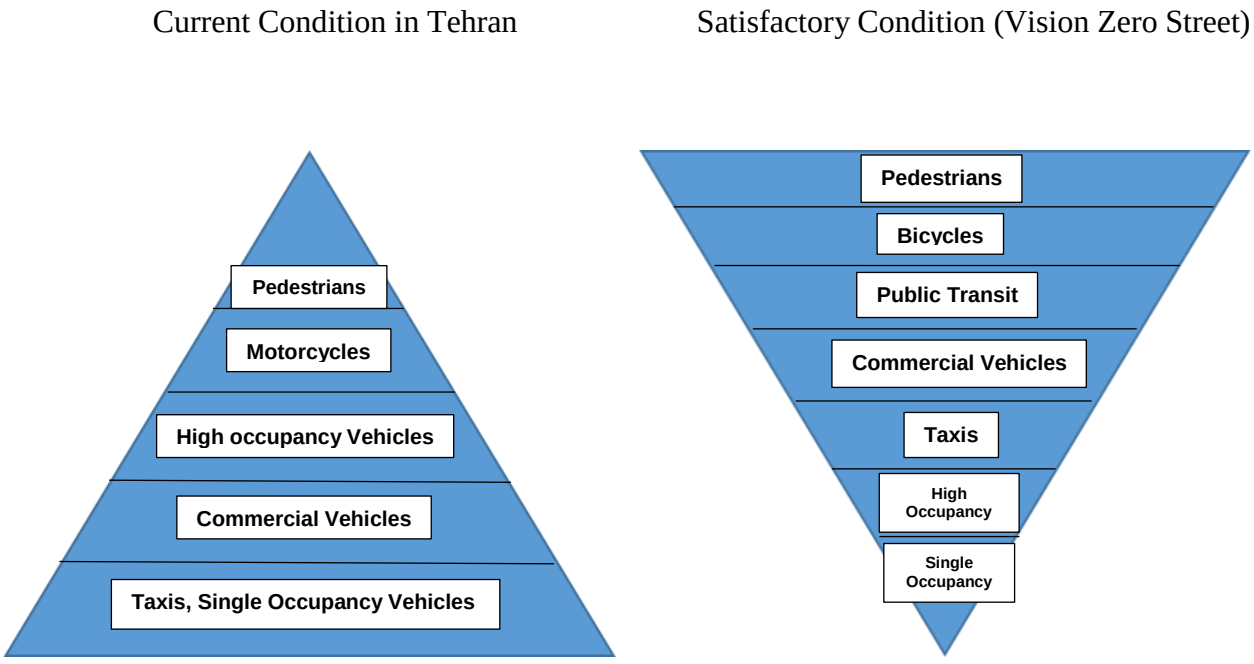

Figure 6 Prioritization of travel choices
Source: Moeini, 2015

Street-scale interventions have been shown to be associated with 35–161% increases in physical activity and also a variety of co-benefits that enhance community health and livability (Bloomberg, Burden, Burney, Farley, & Sadik-khan, 2013; Braun, 2015). Specific examples of pedestrian physical street-scale interventions include intensified roadway lighting, traffic calming approaches, enhanced street landscaping, improved safety and aesthetics, pedestrian refuge islands, continuity and connectivity of sidewalks and streets, and proximity of residential areas to destinations. These interventions not only impact positively on the pedestrian safety concerns, but to some extent may lead to the increase of social cohesion, traffic safety, and community integration among the neighbourhoods' residents and declining the degree of isolation (Bloomberg et al., 2013; Braun, 2015).

2.2. Review of Sidewalk Characteristics

Many researchers have observed that the safety of pedestrians is becoming an issue worldwide since pedestrians are considered to be part of vulnerable road users as they may be exposed to higher risk of injury and fatalities in neighbourhoods with inadequate pedestrian physical infrastructures (Ariffin & Zahari, 2013; Rocchi & Bathurst, 2009; Toronto Public Health, 2014; Heidari Kani, 2015; WHO, 2013) . A significant proportion of "vulnerable road users" are comprised of pedestrians (especially seniors, children, and a person with disabilities such as vision impairment) and cyclists (Rocchi & Bathurst, 2009; Heidari Kani, 2015; Toronto Complete Streets Guidelines, n.d.). The studies have found that pedestrian vulnerability has occurred mainly due to the lack or inadequate presence of sidewalks, which implies that pedestrians must either walk in the roadway, or walk alongside the road in an unfriendly environment (Ariffin & Zahari, 2013, p.

590), and this highly affects residents travel mode choice and pedestrian fatalities (Toronto Public Health, 2014).

Ultimately, other studies argue that along with advocating for a sustainable walkable city, in order to increase the level of residents' physical activity in both disadvantaged and advantaged communities with high resources, "qualities of built environment must meet the pedestrian needs and expectations" (Bahari, Arshad, & Yahaya, 2014, p. 355). "Pedestrian's satisfaction level depends on their perception of the characteristic of the pedestrian environment such as a physical component ratio of sidewalks they use" (Sukhbaata & Harada, 2011, p.1). Consequently, an improvement in pedestrian sidewalk facilities, can result in pedestrians' satisfaction and encourage walking. Moreover, enhanced sidewalks can raise people's eagerness to move in for social, optional and necessary activities (Shafabakhsh & Mohammadi, 2014; Zarghami et al., 2015).

Some research indicates that the likelihood of walking and a positive walking experience are affected by the quality of walk path network which contributes toward pedestrianisation (Bahari et al., 2014). Through an incorporation of aesthetics and amenities elements, the presence, scale, and overall composition of these elements matter a great deal in our decision to walk (Bloomberg et al., 2013).

In addition, the evidence shows that design characteristics of the sidewalk zones influences the vast majority of pedestrian fatalities and traffic safety. Beyond providing safe pedestrian movement and access, sidewalk zones also expand the function of streets from simply moving people to also serving as vital public spaces that contribute to a more livable and sustainable neighbourhood that relies more on walking mode choice than vehicular transportation mode (Toronto Public Health, 2014; Toronto Complete Streets Guidelines, n.d.).

According to the pedestrian safety index in Figure 7 Iran as a developing country experiences a high number of pedestrian fatalities per year compared with other countries. Inappropriate policies and/or a lack of integrated city planning have resulted in developing a city that does not support pedestrian perceptions and needs which this tremendously increases pedestrian fatalities and road accidents. Thus, this results in a high percentage of pedestrian fatalities and conflict among pedestrian, cycling and motor-vehicles.

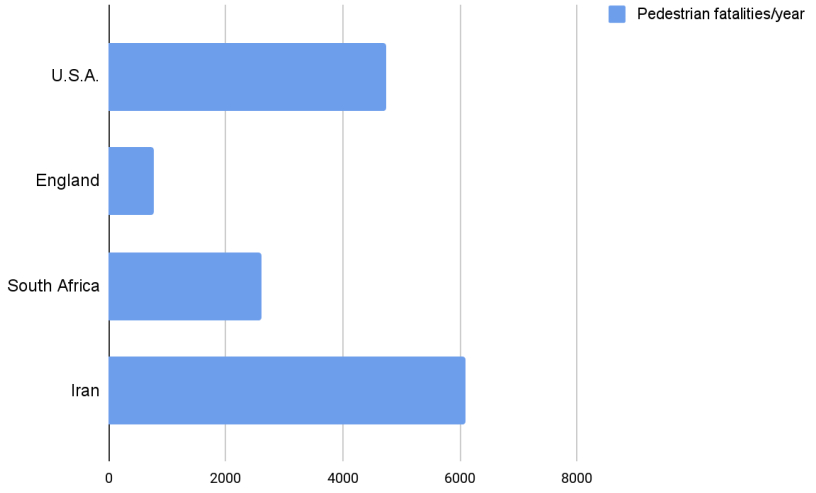

Figure 7 Pedestrian safety indexes

Source: author's work with base data source from Rouzikhah & Shabani, 2008

2.2.1. Sidewalk Safety

Eun and Ranck (2010) in *designing for pedestrian safety* address walking along the road accounts for 10-15% of pedestrian crashes. This percentage could be reduced by the implementation of a sustainable and resilient sidewalk that supports the urban resident's safety and

well-being. In this regards, Moeini (2015) in *walkable cities* stated that the main concerns of pedestrians are when crossing sidewalks, street widths, and overpasses, because, according to the head of traffic police in Tehran province pedestrians account for most of the victims of fatal accidents in Tehran; based on statistics 45% of fatalities in road accidents are pedestrians. The author further (Moeini, 2015) mentioned the main significant reasons for fatal accidents include lack of adequate sidewalk, non-standard passages and lack of pedestrian bridges. As such, there are some local roads or alleys that are dedicated to pedestrian zones, but recently, due to the volume of traffic and escaping from traffic congestion in main roads; they have been turned into the route for vehicular passing is endangering pedestrian safety. Thus, despite changing the capacity of roads, no adequate sidewalks have been constructed or developed for pedestrian's safety.

The presence of sidewalk and separation from motorized traffic were found to have particularly large safety benefits in residential and mixed residential areas (McMahon et al., 2002; Cauwenberg et al., 2016). Therefore, from a safety point of view, sidewalks should be considered on a minimum of one side of the street for arterial and collector roads (Federation of Canadian Municipalities and National Research Council, 2004).

In addition to safety, enhancing a sense of community must be strengthened within a built environment. Safe walkable streets can foster social interaction among individuals with diverse backgrounds, and thereby increase social trust (Braun, 2015, p.6). Therefore, it is important to highlight that walkability measure may vary by the degree of neighbourhood safety.

Other than factors discussed, there are factors associated with sidewalk design standards within an urban infrastructure. The research findings indicated that sidewalks should be designed and incorporated for all urban users including vulnerable users (Federation of Canadian Municipalities and National Research Council, 2004), with significant characteristics that impact

on accessibility, connectivity, continuity, affordability, consistency, and safety (Kang, Seo, Kyu Kim, & Sok Kim, 2012). These key factors contribute effectively to a sense of sustainable walkable city. However, well-designed sidewalks to accommodate different users require policies and regulations in harmony with the pedestrian's needs and motives. Furthermore, the finding by Bloomberg et al. (2013) demonstrated that "a poorly designed sidewalk can be a deterrent to pedestrian traffic. This supplement to the Active Design Guidelines is intended to assist designers and governments to create beautiful, enjoyable sidewalks that make our cities more walkable and our citizens healthier" (p.5).

2.2.1.1. Lighting

In a study of sidewalk physical infrastructures, it was found that lighting along the street segments improves perceptions of safety, especially for someone with vision impairments or balance/strength problems (Toronto Public Health, 2014), and also acts as a deterrent to criminal activity, ensures that pedestrians are visible to motorists and illuminates potential tripping hazards as well (Toronto Public Health, 2014; Toronto Complete Streets Guidelines, n.d.). In addition, this study further indicated that the installation of street lighting at mixed-use locations in London, England, leads to an increase in physical activity of resident (Toronto Public Health, 2014). However, several studies asserted that there is no consistent evidence of an association between street lighting for a means of safety and level of physical activity and this may be partly attributed to measurement limitations (Duncan, Spence, & Mummery, 2005; Foster & Giles-Corti, 2008).

2.2.1.2. Curb and Bollard

The report from the *City of Toronto* has indicated that the city is considering curb and sidewalk bollards to accommodate pedestrians' safety. Sidewalk treatments for separation from motorized traffic or parked cars range from buffers and physical delineators to visual contrast and tactile indicators (Toronto Complete Streets Guidelines, n.d., p.91). Accordingly, Cauwenberg et al., (2012) argued that installation of bollards at least can help pedestrians to walk without falling or spraining their ankle. Lack of bollards, particularly in city centres with a high concentration of residential commercial mix may increase a risk of pedestrian crashes by motorcycles driving on sidewalks due to traffic congestion. Moreover, parked motorcycles create obstacles on sidewalks. Figure 8 demonstrates some of the examples of installed bollards in Tehran and also show that in areas that there is a lack of curb or bollard, it has resulted in a conflict between pedestrian sidewalk and parked cars.

Figure 8 The comparison between sidewalks with/without curb and bollards in Amirabad, Tehran
Source: author

Another study in New York City has shown that bollard installation extensively influences pedestrian safety and therefore their use has become an integrated part of the urban landscape which provides new opportunities to make streets more inviting and safe for all urban users (Rethinking Bollards, 2007). Despite the positive outcomes from the installation of bollards in highly land-use mixed neighborhoods, there are some negative perceptions regarding bollards functionality. In this regard, the report (Rethinking Bollard, 2007) has argued that "bollards impede people with visual and mobility impairments; bollards interfere with snow plowing;

permanent steel bollards cause damage to vehicles; and retractable bollards cause damage to vehicles" (p.17-8). Despite the positive outcome of bollard installation, the municipality of Tehran in sidewalk guideline has indicated that installation of any barrier in the pedestrian path, such as sidewalk leveling differences, parked motorcycles and vertical barriers (bollard) is prohibited. However, in a case of a need for installation of bollards for pedestrian safety due to high disturbance by motorcycles in sidewalks, obtaining a licence prior to the installation is necessary (Municipality, personal communication, March 4, 2017).

2.2.1.3. Width

The proper sidewalk width is one of the components of sidewalk quality which is based on expected pedestrian volumes (Rocchi & Bathurst, 2009) and space for landscaping and amenities as well as space to walk, socialize, or merely enjoy their surroundings (sidewalk width, 2015). Figure 9 demonstrates some examples of inappropriate sidewalk width in areas with a high density and local roads.

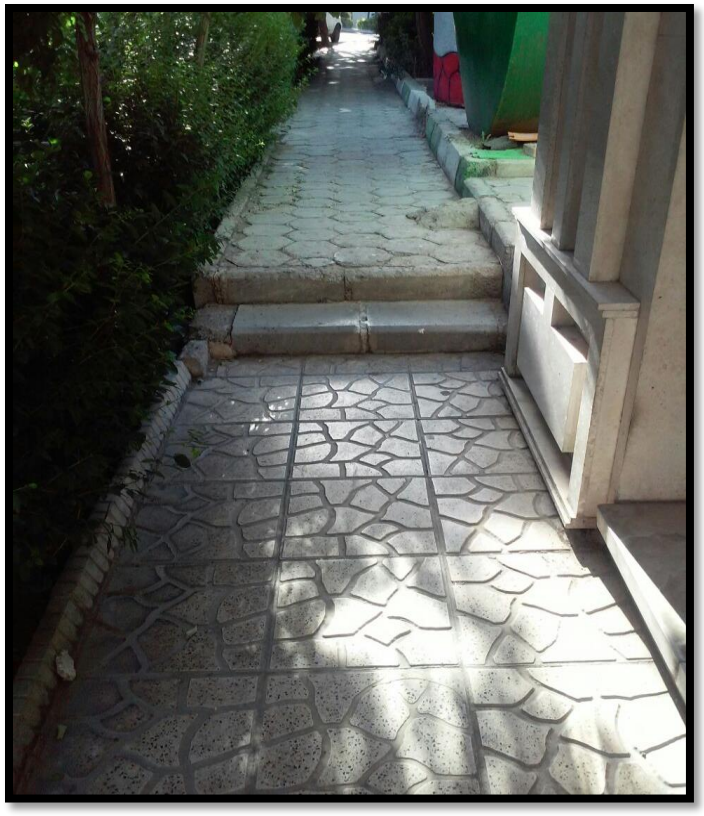

Figure 9 Inappropriate sidewalk width in Amirabad, Tehran
Source: author

In more comprehensive details, Toronto Complete Streets Guidelines (n.d.) asserted that "sidewalk widths should be commensurate with the intensity of pedestrian activity and volumes at intersections, to minimize crowded conditions, and potential conflicts among mode" (p.149). Moeini (2015) indicated that an adequate proper sidewalk space per person is an average about 2.51 square meter. Table 1 Demonstrates an adequate sidewalk width for district 6 of Tehran. An appropriate width for both roadways and sidewalks needs to be implemented in order to reduce disruption of the movement of vehicles and pedestrians, which leads to an increase in pedestrian fatalities.

Table 1 Minimum sidewalk width (Tehran Municipality, District 6, personal communication, March 4, 2017)

Sidewalk Type	Minimum Sidewalk Width (mm)	Minimum Margins (mm)
Freeways	No sidewalk needed	-
Highways	3000	2000
Arterial roads	2000	1500
Collector roads	2000	Curb extension for additional sidewalk features
Local roads	1400	Curb Extension for additional sidewalk features

As indicated in table 1, collector and local roads need a substantial margin width in order to provide space for green infrastructure and street furniture. In addition, a curb extension accommodates other sidewalk infrastructures such as fire hydrants, bus stops, pedestrian scale lighting, waste/recycling collection and snow storage (Toronto Complete Streets Guidelines, n.d.).

2.2.1.4. Evenness and Surface Pavement

It is observed that uneven sidewalk and broken sidewalk surfaces are mostly causing stress for most pedestrians, particularly vulnerable users. Due to inappropriate sidewalk condition, a pedestrian undoubtedly feels unsafe to walk, as there is a high risk of falling and being injured when walking on uneven sidewalks. Cauwenberg et al. (2014) suggest that providing even sidewalks increases the appeal for walking to transport. However, an even sidewalk not only promotes a walking to transport, but also it increases the vitality of sidewalk for other utilitarian purposes. Furthermore, another study has reported that uneven road surfaces are the main reason

of not using sidewalks in the age group over 40yrs old compared with participants under 40 years old (Zarghami et al., 2015). Figure 10 illustrates sidewalks in Amirabad neighbourhoods with an uneven and broken mosaic surface pavements.

Figure 10 Uneven and broken mosaic sidewalk surfaces in Amirabad neighbourhood
Source: author

2.2.1.5. Cost

Development of pedestrian physical infrastructure highly depends on the city financial budgets and sidewalk priorities. Lack of sufficient financial budget for constructing sidewalks that are able to perceive pedestrian needs is the main concern for the city development initiatives. Heidari Kani (2015) stated that due to financial restrictions, completion of project place at a more priority than operation quality and a proper functionality of other aspects of the project. According to the municipality of Tehran, district 6, sidewalks have been categorized into three types. Table 2 demonstrates sidewalk width that extensively relies on the road burden condition and type of land use design which typically affect sidewalks in arterial roads of district 6 have been considered as type II of sidewalks. Typically, type II sidewalks are implemented where no traffic load exists and margins serve for commercial, recreational and public places. It has been noted that type II is not recommended in places such as entrances to parking or in parking spaces as well as routes for car movements. Moreover, type IV of the sidewalk is usually implemented in the collectors and local roads where the road carries a high burden of traffic loads. (District 6 Municipality, personal communication, March 4, 2017).

Table 2 Pedestrian pavement types and their use (Municipality, District 6, personal communication, March 4, 2017)

Priority	Sidewalk Type	Road Burden condition	Type of Land use
1	Type I	Traffic load and non-traffic load	It works for different land uses
2	Type II	Non traffic load	Sidewalks with margins for commercial, recreational and arterial passages
3	Type III	Non traffic load	Sidewalks with margins for commercial, recreational and arterial passages
4	Type IV	Traffic load and non-traffic load	Parks; parking and collector passages

The cost for each type will be considered by the assigned municipality for each district in Tehran. It is important to note that each household is obligated for an annual property tax which includes waste management tax and development tax. Sidewalk development is part of an annual development tax that each household pays for. However, there is no data for an exact assigned percentage of tax that is dedicated to sidewalk construction, repair or extension.

3. Methodology

A choice experiment (CE) is a 'multi-attribute preference elicitation technique' first conceptually grounded in the Lancaster demand theory in the early 1960s to evaluate potential new products and new markets for existing products (Azimi & Asgary, 2013, p.244). The CE as a flexible method initially was employed under the name of conjoint analysis and more likely used in the marketing literature in the early 1990s to determine how people value different attributes that make up a product or service (Azimi & Asgary, 2013; Patterson, Darbani, Rezaei, Zacharias, & Yazdizadeh, 2017). According to Lancaster theory, "the structure interposed between the goods themselves and consumer's preferences is, in principle, at least, of an objective kind. So that the personal element in consumer choice arises in the choice between collections of characteristics only, not in the allocation of characteristics to the goods" (Lancaster, 1966, p.134). In other words, consumers demanded individual attributes or characteristics of the goods or services, not the goods themselves. For instance, consumers do not demand a Lap top in itself, but rather the possessed attributes of the laptop (e.g. memory, color, resolution screen, USB type port etc) status are demanded by consumers to choose between hypothetical alternatives characterized by attributes.

The main advantage of the CE method is that it allows analysis of a hypothetical situation designed to estimate the willingness and actual intention of customers to pay for market goods. The basis of the CE method is that the choices of individuals can be used as related characteristics of the proposed topic which can be analyzed and modeled through a theory of random utility. Random utility theory is based on the hypothesis in which the choices of individuals are placed on the characteristic (attributes and levels) of the products along with some degree of randomness and probability (Snowball & Willis, 2006; Rafieian, Asgary, & Asgarizadeh, 2008).

The CE approach is essentially based on carefully designed choice tasks and scenarios whose purpose is to clarify the main factors affecting the selection of individual choices (Hanley, Wright, & Adamovics, 1998). The CE requires careful design of attribute levels and ranges in which to reveal the characteristics of the goods or services. On the other hand, selected attributes should be "relevant to the problem or policy being analyzed, credible, realistic, capable of being understood by the sample population, and of applicability to policy analysis" (Bergmann, Hanley, & Wright, 2006, p.1007). To complete the questionnaire and the selection of attributes and levels, literature review, field studies, focus groups, and expert opinion protocol are often used to explore and identify topics related to positive and negative attributes of the proposed research topic.

Having a low number of choice tasks enables the CE to present all possible choice combinations. While an increase in choice tasks make a survey exponentially very time consuming and boring (Rafieian et al. 2008). Thus, using of statistical design theory helps to "yield parameter estimates that are not confounded by other factors" (Hanley et al., 1998, p. 415). In other words, the orthogonal designs eliminate the number of alternatives by removing correlation between attribute levels which is calculated by SPSS statistics software. The CE enables respondents to trade-off one element from one another by choosing between different attributes. It is important to note that to measure a monetary attribute such as cost or price, the focus group or expert opinion will help to indicate the minimum and maximum attribute levels.

3.1. Choice Experiment Design

To design a standard choice experiment survey it is important to initially choose attributes that potentially reflect a sidewalk's characteristics and individual's preferences. In order to define

the attributes and attribute levels, the finite list of attributes that contribute to sidewalk's safety must be selected and compiled. As discussed earlier, a high number of attributes may impact on the difficulty of respondents to choose among choice tasks. Thus, if a list of attributes is deemed to be too extensive and broad, the list of alternatives must be culled and reduced into reasonable attributes (Hensher, Rose, & Greene, 2005; Patterson et al., 2017).

A first approach is to conduct focus groups to identify the numbers of attributes and attribute levels. The focus group approach assists in selecting attributes that are deemed to be significant for an increase of walking behaviours of residents. Conducting a focus group allows focusing on residents' walking concerns compared to other attributes. Some studies indicated that focus groups aim to reduce attributes to the most salient and relevant to the case study, and also, to verify the appeal of attributes commonly described in the literature (such as lighting etc.) (Patterson et al., 2017; Davies, Laing, & Macmillan, 2000). "The inclusion of more than four to six attributes in a CE experiment has been found to render surveys confusing and too much for respondents to process" (Patterson et al., 2017, p. 66). In order to evoke the reviewed possible attributes from the compiled list, three groups of residents were organized to extract the actual information based on residents' perceptions. As the scope of the survey was determined, it was decided that a group of 10 to 15 participants is required to design a focus group. Two focus group invitation letters were written (one in Farsi and one in English) that outlined the scope of the research and focus group instruction. Both versions of the survey invitation letters have been included in Appendix A. In total, about 50 invitation letters with information about the study instructions via door-to-door were distributed to some of the homes in the study area as well as the shops and university residence. Also, invitation letters were handed out and distributed to community people. People interested in participating in the focus group were instructed to make a

phone call to a researcher which the number has provided and addressed in the invitation letter. Also, the participants were instructed to let the researcher know about their availability for 30-45 minutes meeting of the focus group. Using this method, from 50 invitation letters that distributed, about 21 people agreed to take part in the focus group meeting. However, this number was reduced to 11 people due to their work schedule and family issue. Attempts were made to recruit a variety of Amirabad residents, including local residents, university students, and local businesses. Consequently, a total of 11 people were confirmed to attend the meeting in which 4 of them were university students, 3 people were from local businesses, and 4 people from the local residents.

One focus group was held in Amirabad neighbourhood in the city of Tehran during February 2017 addressing the perceptions of Amirabad residents about sidewalk safety attributes and their preferences between different attributes. This group was asked to identify the list of important attributes that could be tested and contribute to the safety of sidewalks. However, the intention of holding one focus group was two-fold. First, it enabled me to bring voices of various groups of a neighbourhood without being biased in conducting a focus group; and second, participants were able to exchange their ideas while discussing their experiences and concerns. The focus group meeting was held at one of the local business locations during morning time and it lasted for 45 minutes.

The focus group was structured in three stages. In the first stage, the purpose and the scope of the study was introduced to participants and all the participants were introduced to each other. In the second stage, the consent form was distributed to the participants. The consent form reviews the overall concept of the research study and the fact that participants are able to choose to avoid talking and leave the group at any time (Kaczynski & Sharratt, 2010). Both versions of the consent forms (one in Farsi and one in English) have been included in Appendix B. After collecting the

consent forms from the participants, the discussion was started. For analyzing data from the focus group, we used notes that were taken during the discussion. The focus group was conducted in Farsi/Persian language and translated into an English for further analysis.

In the third stage, participants were involved in the series of questions and generated a discussion on functions of sidewalks in the Amirabad neighbourhood. In order to increase the realism of the CE attributes and characteristics, it was decided to choose broad discussion questions about physical activity behaviour, neighbourhood dynamics, and other related issues. The broad discussion questions were purposefully designed to allow participants to not limit themselves in the context of a question rather than using tailored questions that retrieved from the conceptual or empirical literature (Kaczynsk & Sharratt, 2010).

List of questions that have discussed in the focus group:

- *Why did you choose Amirabad neighbourhood to live?*
- *How do you describe your neighbourhood walkability?*
- *What do you like more about neighbourhood's sidewalks?*
- *What discourages you from walking more?*
- *How do you rank the sidewalk safety of your neighbourhood?*
- *What are the highest priorities that need to be implemented while designing a sidewalk for safety?*

During recruitment, some of the socio-demographic characteristics of the focus group participants were recorded and collected. Table 3 outlines some of the characteristics including age, gender, occupation, and length of residency in the study area.

Table 3 Socio-demographic characteristics of the focus group in the study area
Source: author

Gender	Age	Occupation	Length of Residency
Female	26	Post-secondary student	7
Female	23	Post-secondary student	5
Female	21	Post-secondary student	3
Female	23	Post-secondary student	5
Female	50	Housewife (Local resident)	15
Female	49	Housewife (Local resident)	6
Male	54	Retired (Local resident)	6
Male	21	Post-secondary student (Local resident)	6
Male	58	Supermarket (Local business)	35
Male	34	Print-copy (Local Business)	11
Male	46	Fast food (Local business)	45

3.2. Focus Group Discussion

The focus group discussion was arranged to explore the insights, expressions and perceptions of Amirabad neighbourhood residents about the correlation between the urban design and pedestrian physical movement. According to Hanley et al. (1998) conducting a focus group allows a researcher to explore hidden facts that are only experienced by the neighbourhood

residents and are important from the point of view of ordinary people; and also, their attitudes to paying for improvements in desirable attributes (p.421).

Certain themes emerged during the group conversation which provided a broad understanding of neighbourhood walkability. One of the most common types of comments evolved around the neighbourhood's centrality and the fact of being in the middle of the city for easy access to transportation, shopping centres, health care services, government, and institutions, etc. Land use diversity and a sense of close proximity to one another allowed the Amirabad residents to access multiple destinations. "Indeed, the mix of proximal land uses appeared to influence many residents' transportation choices, at least for those destinations that were accessible in the neighborhood" (Kaczynsk & Sharratt, 2010, p.4). Additionally, according to Toronto Public Health (2014), within land use planning, the term *complete communities* is used to refer to communities that provide all the physical and environmental facilities that are necessary for urban inhabitants, and these facilities are accessible equally to all residents. In other words, the complete communities aim to facilitate the neighbourhood residents with variety of services and reduced vehicle-oriented approach. Overall, land mixed-use was the most important theme addressed by Amirabad residents during the focus group discussion.

A walkable neighbourhood is one of the sustainable features of built environment that simply encourages people to walk to their destinations. Accordingly, the residents linked the relationship between the neighbourhood design and preferences that affect their travel choices. They expressed support for the idea of a walkable neighbourhood, relying less on motor vehicles. As described, residents valued the presence of Laleh Park as one of the greatest and largest parks in district 6 of Tehran for walking, jogging, and hanging out with other community members. Although the main streets of Amirabad support the notion of a walkable and sustainable

neighbourhood and address the main features of sidewalks, still many local and collector roads and alleys do not satisfy the urban resident's needs. However, despite the appreciation for the Laleh Park, some residents were concerned about the lack of safe sidewalks for walking and physical activity.

As the scope of the study was revolving around the sidewalk's safety, participants provided their experiences about neighbourhood's safety. Lack of adequate lighting in sidewalks prevents many residents from walking, particularly young students who preferred to choose a taxi or public transportation for the commute as they felt unsafe during an evening and early morning in winter times. Sidewalk width or lack of sidewalks was another concern brought forward by the residents. Due to construction and redevelopment sometimes sidewalks are blocked or narrowed down which makes walking particularly for disabled people uncomfortable.

In addition, residents examined the factors associated with walking in locations with no sidewalks and/or exposure to various situations which causes a risk of vehicle/ motorcycle crashes. It was indicated that "locations with no sidewalks were more than twice as likely to have pedestrian/motor vehicle crashes than sites where sidewalks exist. The presence of sidewalks was found to have a particularly large safety benefit in residential and mixed residential areas" (McMahon et al., 2002, p.1-2). As such, sidewalks without curbs and bollards may increase the risk of pedestrian crashes more highly than areas with fencing and a barrier system in sidewalks. It is important to note that "some fencing and bollards that are used in pedestrian areas may be strong enough to provide physical protection from errant motor vehicles, to prevent people from falling onto a roadway or simply as visual cues that provide guidance to road users" (Arason, Boase., Belluz, Desapriya, Dewar, Eisan, Gane, Miller, Peddie, Todd, Wilson, & Zayoun, 2013, p.61). Therefore, the focus group participants emphasized the role of curbs and bollards in

increasing sidewalk safety where the chances of entering the vehicle/motorcycle in the sidewalks are high due to the lack of parking availability or traffic congestion.

The final theme that was discussed during focus group discussion was related to the price/cost of developing and constructing sidewalks in district 6 of Tehran. The residents expressed the level of connectedness that exists between sidewalk development and the cost expenses for the municipality per square meter. Annual municipal taxes may differ, depending on the house sizes per square meter and its location in each district of Tehran. Annual municipal taxes for each household are including urban development and the cost of waste management which must be paid at the end of each year. Sidewalk development expenses for the municipality have been included in the urban development taxes. However, urban development taxes per households have not been broken down into details for certain development in the city. Therefore, there is no separate estimated cost for sidewalk development indicated in an annual municipal taxes for each household in the city of Tehran.

3.3. Survey Questionnaire Design

The questionnaire survey was conducted in the Amirabad neighbourhood to assess the factors contributing to walking and physical activity behaviour. The questionnaire consisted of three sections. The first section comprised socio-demographic characteristics of the sample population (i.e. age, gender, income, education level, etc). The second section included behavioural and opinion questions with respect to the walking attitudes and factors impact residents on different travel choices. As such, this part included questions about the walking experiences of residents, distance to public transportation, quality of sidewalks, factors preventing

walking, and an importance of different factors on walking attitude of residents. The third part of the questionnaire designed for valuing bundles of attributes that presented in different choice cards.

3.4. CE Design

As stated earlier, the selected attributes for designing a CE have been collected from a focus group study. Five important selected attributes are sidewalk with lighting and brightness, sidewalk width, sidewalk curb and bollard, sidewalk evenness and city expenses for constructing a sidewalk per square meter in district 6 of the city of Tehran. For the sidewalk lighting attribute, two levels of '*adequate lighting'* and '*not adequate lighting'*, two levels for sidewalk's width which are '*narrow sidewalk'* and '*wide sidewalk'*. Two levels of Sidewalk '*with bollards'* and '*without bollards'* were considered for sidewalk bollard attribute. For sidewalk leveling condition, two levels of '*sidewalk is leveled and with even pavement'* and '*sidewalk is not leveled and without even pavement'* were chosen. Finally, four levels were introduced for the cost attribute, which is *'0 Tomans', '1, 00,000 Tomans', '2, 00,000 Tomans' and '3, 00,000 Tomans'*. Table 4 presents a list of attributes and levels that have been used in the CE survey.

Table 4 List of attributes and levels in the CE design
Source: author's work

Attributes	Levels
Sidewalk Lighting and Brightness	Not Adequate Lighting, Adequate Lighting
Sidewalk Width	Narrow, Wide
Sidewalk Curbs and Bollards	Without Curb and Bollards, With Curb and Bollards
Sidewalk leveling condition	Sidewalk is leveled and with even pavement, Sidewalk is not leveled and without Even Pavement
Sidewalk Cost (per square meter)	0 *Tomans, 1,00,000 *Tomans, 2,00, 000 *Tomans, 3,00,000 *Tomans

* 1 US $ = 3200 Tomans when this study carried out.

An attempt was made to reduce the number of attributes and levels to the most relevant people's neighborhood choices by considering a balance between providing realistic scenarios while avoiding unnecessary complexity by having a long list of attributes (Azimi & Asgary, 2013; Hess & Rose, 2009; Patterson et al., 2017). Having a long list of attributes may cause challenges for both respondents and surveyor. Some of the challenges might be related to the function of the CE survey, as the method employed in this survey was based on text-only for describing attributes and levels instead of using visual images.

As of another challenge, it is important to note that, due to insufficient time, this study was limited to text-only which may affect respondents' choices or wrong assumptions for some of the attributes when deciding for different choices. According to Patterson et al. (2017), "in the virtual reality survey, respondents are able to navigate simulated neighborhoods in which they received supplementary textual information as they viewed alternative virtual neighborhoods. By contrast, the text-only survey provided written attribute descriptions" (p.64). On the other hand, considering that in order to simplify the CE studies for the sample population with less time consuming, it was recommended to limit the numbers of attribute and levels as low as possible (Azimi & Asgary, 2013).

Having one attribute with four levels and four attributes with one level, ($4^2 \times 1^4 = 64$) gave a total of 64 combinations of alternative scenarios for choice sets. A previous study has recommended that since having a high number of alternatives are not traceable in a choice experiment, "we need to choose a subset of all possible alternative combinations, while following some criteria for optimality and then construct the choice sets" (Alpizar, Carlsson, & Martinsson, 2001, p.16). An orthogonal design makes a possibility to reduces the total number of combinations

to the desired choice tasks that exhibit zero correlations between each of the attributes (Hess & Rose, 2009; Bergmann et al., 2006; Hanley et al. 1998).

Furthermore, the results from the orthogonal design revealed 24 choice scenarios in which divided into two 12 choice tasks. Each version contains six sets of two sidewalk alternatives. Also, for each choice set, the option of *'neither of these options'* has been used, in a case of rejecting both options in each choice set. The respondents were asked to a trade-off between different sidewalk alternatives for each choice set.

4. Analysis and Findings

The following section summarizes the results obtained from the survey questionnaire and a cross tabulation which examines the relationship between some of the socio-demographic predictors of walking with other factors such as occupation, age, income, education, and street type. However, as the objective of this research paper is to assess the sidewalk attributes through using a choice experiment method, an in depth descriptive of finding from a choice experiment methodology is taken under results section.

4.1. Survey Questionnaire Findings

In the first section of the questionnaire, respondents were asked to answer some demographic questions. The summary of findings that obtained from demographic questions of 95 participants is presented in Table 5.

Table 5 Demographic characteristics of respondents Source: author's work

Demographic Characteristics	
Years at Current Address	
1-10 Years	56.0%
11-20 Years	24.0%
21-65 Years	20.0%
Age	
18-24	15.8%
25-34	31.6%
35-44	15.8%
45-54	20.0%
55-65	13.6
65 and over	3.2
Gender	
Female	25.3%
Male	74.7%
Education	
Under diploma/Diploma/College certificate	31.9%
Bachelor degree	41.5%
Master degree	19.1%
PhD degree	7.4%
Employment Status	
Governmental jobs	38.3%
Business jobs	34.3%
Retired	12.8%
Housewife (Home duties)	14.9%
Income	
0-6,00,000 Tomans	17.8%
6,00,000 - 1,500,000 Tomans	34.4%
1,500,000 - 2,500,000 Tomans	25.6%
2,500,000 and over	22.2%
Current Living Street Type	
Collector road	51.6%
Arterial road	27.4%
Alleys & dead end road	21.1%
Current Living Building Type	
Apartment	72.6%
High-rise building	16.8%
House	10.5%

Table 5 demonstrates that over the past 10 years, there has been a steady increase in the number of residents of the Amirabad neighbourhood. Of the participants, about 56.0% were living in the neighbourhood between 1 to 10 years. Based on our sample, it seems that the Amirabad neighbourhood has a relatively young population between the ages of 25 and 34.

The number of participants in this study was not gender-balanced. The data presented that about 25.3% of participants were female and 74.7% male. Due to the relatively young population, the number of educated people has also increased. Considering that education in Iran seems to be one of the important achievements and each household has at least a post-secondary student, the number of people with a university degree has increased and this growth has reached to 41.5% at the level of the bachelor's degree.

Given the fact that Amirabad neighbourhood has a very young population with a post-secondary degree, the number of people with employment status and occupation will certainly rise. About 72.6% of the total participants are employed both in governmental jobs or run their own businesses.

In Tehran generally, as one moves from south to north, the income level of the population increases, hence the housing and property price per square meter dramatically increases. Consequently, there are more households with better job status and higher income level. With regard to the geographical location of the Amirabad neighbourhood which is located in the city centre (Fig. 2), the majority of households are considered to have an average monthly income level between 6, 00,000 to 1,500,000 Tomans (34.4%).

Due to urbanization, the preference to live in small housing units and high-rise buildings rather than living in houses with a courtyard has had a profound effect on the decline of physical activity. In addition, with the increase in vertical construction and the price of houses in Tehran,

most urban residents prefer to live in an apartment. This is mostly due to an increase in vertical construction development, the increase of housing unit prices, and changing city patterns. Interestingly, the data demonstrates that about 72.6% of participants were living in an apartment (low-rise buildings), and also the highest percentage of participants (51.6%) were living in collector roads.

In order to gauge the effect of different transportation modes on physical activity of the residents, some questions related to the transportation choices and the importance of walking in their daily schedules have been employed. Interestingly, 41.1% of the respondents preferred public transportation, 45.3% were car-dependent and only 13.7% chose walking as a preferred type of transportation mode which is unfortunately very low compared to other types of transportation mode choices (Fig. 11).

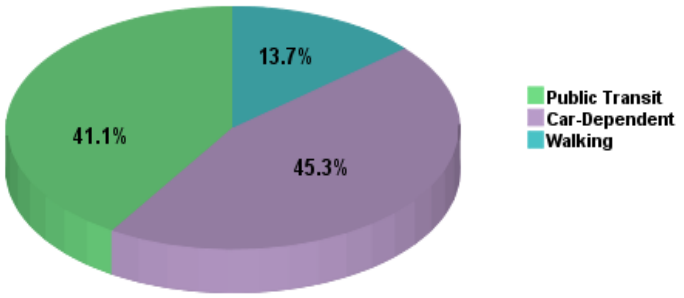

Figure 11 Transportation mode preferences of Survey responders
Source: author's work

According to the data obtained from the participants, most of them had a desire to drive, and the most important reason for them was driving to their workplace (36.1%); 23.6% driving to shopping stores; 8.3% driving to school/university campus; and 31.9% driving daily for other purposes than indicated in a survey questionnaire.

In another part of the questionnaire, the importance of walking and the time allocated for different walking purposes were studied. The results (Figure 12) indicate how important it is to walk and the amount allocated for participants. The respondents were asked to include whether and to what extent it is important for them to include walking either for utilitarian purposes or physical activity.

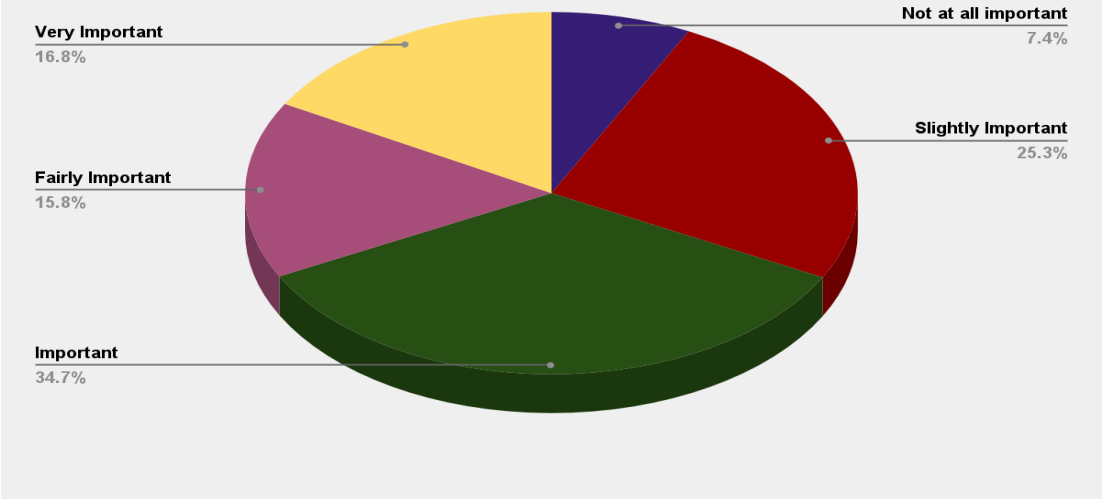

Figure 12 Importance of walking among the survey respondents
Source: author's work

Residents were asked to determine the amount of time allocated to walking. According to Figure 13, most participants walk on average every day or sometimes, compared to only 3.2% that never walk weekly. The most important reasons behind a decrease in walking level might be related to the increase of workload for individuals as well as households with children. It seems that households with children are more likely to be exposed to higher risk of health issues due to less physical activity. Most urban residents, especially residents who live in expensive cities such

as Tehran are more likely to have two jobs and more work hours which in the long term lead to an increase of fatigue and more reliance on private automobile for daily commutes. It is important to note that, considering a location of workplace and resident's place can play a significant role in changing a commute time and less reliance on private cars and further the amount of walking behaviors among the urban residents.

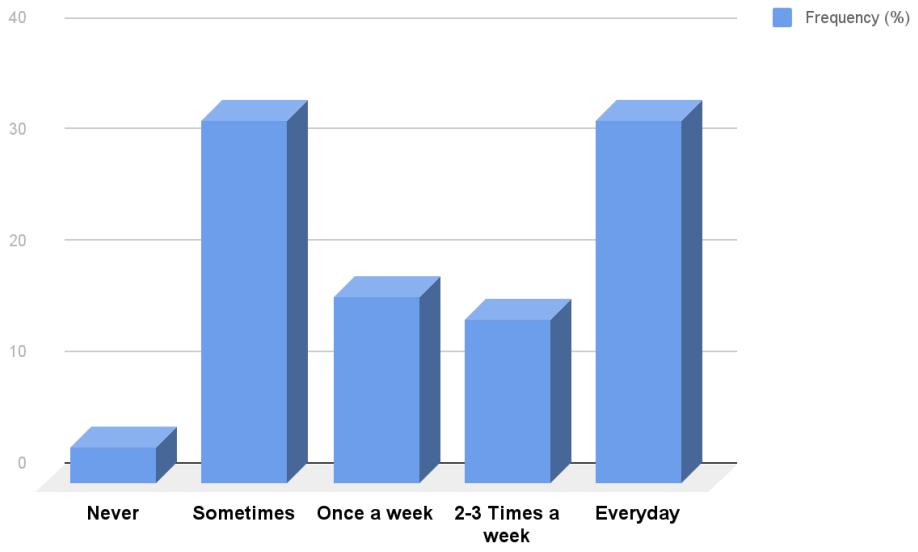

Figure 13 Allocation of time for walking in the study area
Source: author's work

In the second part of the questionnaire, data was collected about the respondent's opinions about the current conditions of their neighbourhood's sidewalk and the main reasons that may affect them to either prevent or encourage for walking. Table 6 presents data obtained from walking behaviours.

Table 6 Data obtained from walking behaviours
Source: author's work

Walking Behaviours	
Sidewalk Condition	
Very poor	4.2%
Poor	44.2%
Fair	42.1%
Satisfactory	9.5%
Reason to Walk	
Work	30.5%
School/University Campus	13.7%
Shopping/Library/ Post office/etc.	28.4%
Social Walking/Jogging	20.0%
Other	7.4%
Bad Experience	
Falling	18.8%
Robbery	7.1%
Jostle	29.4%
Sexual Assault	0.0%
None	44.7%
Reason to Prevent Walking	
Weather Condition	37.5%
Walking with Children	10.4%
Inadequate Lighting	20.8%
No Sidewalk	27.1%
Unsafe Sidewalk	28.1%
Disabled	10.4%
Crowd	31.3%
Uneven Sidewalk	32.3%
Carrying Things (Shopping Bags)	16.7%
Distance to Public Transit	
5 Minute Walk	60.0%
15-20 Minute Walk	31.6%
20-30 Minute Walk	4.2%
More Than Half an Hour	3.2%

The physical conditions of the pavement and its quality make an important contribution in encouraging different urban inhabitants to walk. To this end, residents were asked to express their views on the current conditions of the pedestrian sidewalks. A large proportion of participants (44.2%) agreed that pedestrian conditions were relatively undesirable and poor, and only 9.5% believed that pedestrian conditions were satisfactory and reliable. It is clear that sidewalks in Tehran are not in an appropriate condition due to the lack of some physical facilities such as ruggedness, evenness, insufficient lighting, broken mosaics, and lack of sufficient space to being able to keep pedestrians from urban traffic.

But despite the poor conditions of the sidewalks, many residents still choose the walking mode to do many of their daily activities. In this question, residents were asked to indicate the main reason for a daily walk. The most frequent reason to walk for the majority of participants were walking to work which was about 30.5% of sample population (Fig. 14). After walking to work got a high percentage, walking to shopping, libraries and other urban services (28.4%) were the most important reasons for the participants to go for a walk every day. Considering the type of urbanization in Tehran, most supermarkets have the least spatial distance in each neighbourhood, which in itself has a great influence on level of walking. Walking for the means of physical activity such as social walking, jogging, and walking to school/university campus with 20.0% and 13.7% become the latest reasons for participants to walk, respectively.

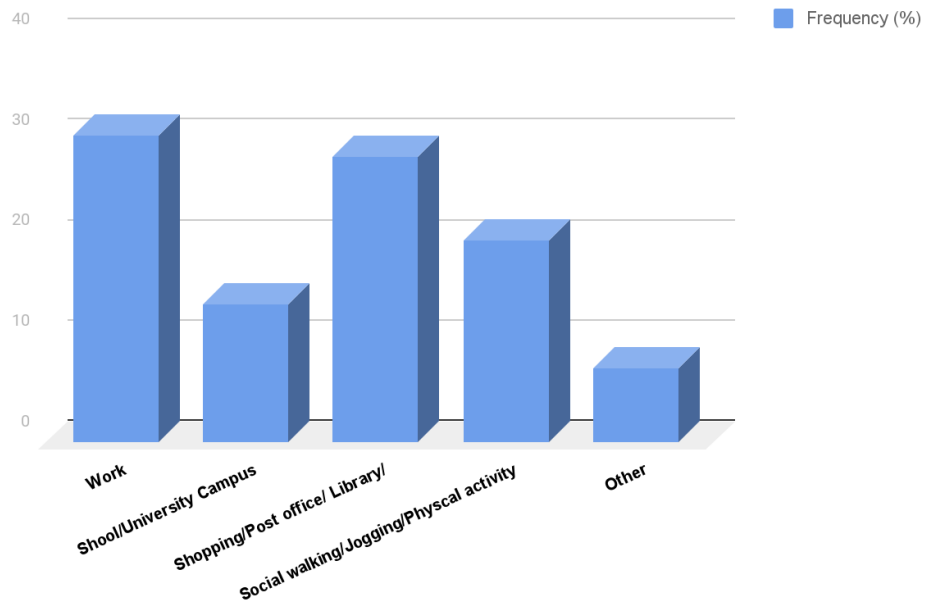

Figure 14 Distribution of participants walking reasons
Source: author's work

Participants were asked to indicate whether or not they had any bad experiences with the sidewalk of their neighbourhood. Pedestrians jostling (29.4%) have been one of the worst experiences of participants. In addition, falling and injuries (18.8%) have also been estimated as their second worst experiences. According to these findings, it can be concluded that the footpaths do not have enough capacity for the pedestrians and also the sidewalks often do not follow the rules of sidewalk width. And, of course, unevenness and inadequate lighting have had a significant impact on the increase of injuries.

In addition to physical factors, there are other environmental factors that cause significant changes in the walking level of residents. The questionnaire continued by assessing the relationship between different factors contributing to prevent the residents from walking. A variety of reasons that might prevent the residents to walk has been included in this question. As predicted and discussed in the focus group, of all the mentioned preventive reasons, weather condition (air

pollution) with 37.5% was considered as one of the main sources for reducing physical activity and well-being of respondents. The excessive greenhouses gases and overheating caused by an increase of automobile dominations which were one of the inhibitors of walking levels. In recent decades, many of urban residents suffering from cardiac, pulmonary, and respiratory infections due to the increase in air pollution. According to one of the students who is living in the Amirabad neighbourhood, bad weather conditions have made it impossible for her to walk, instead, she relies on using a taxi or public transit for the shortest distances, which also has a great influence on reducing her physical activity.

"Sidewalk evenness also appeared as the most important environmental factor influencing a street's appeal for transportation walking" (Cauwenberg et al., 2016). An uneven sidewalk with 32.3% has been determined after weather condition factor as a preventive factor in reducing the walking behaviours of residents. The lack of uniform sidewalks with improper pavement make people with physical disability and wheelchairs less willing to walk on a daily basis. Although, the municipality has laid down many by-laws and policies for pedestrian sidewalk alignment with a required slope, it is unfortunate that still construction of buildings with uneven pavements is under way due to the non-compliance with existing by-laws. The municipality's failure to address such cases has led to an increase in the circumvention of the rules.

Main arterial roads which usually have better conditions for walking are often encountered with crowd congestion, with the presence of street vendors and parked motor-vehicles on the sidewalk, which create disorientation for pedestrians while walking. About 31.3% of the people complained about the existence of overcrowding, which was one of the main reasons for their physical activity. It should be noted that many of sidewalks with reference to their geographic location and type of land use have been designed for a certain number of population in the past.

However, the number of high rise building increased along with a population growth, while an adaptation for pedestrian physical infrastructure has not occurred. Therefore, pedestrian movements particularly, in collector roads and alleys were limited with an insufficient neighbourhood resources.

Sidewalk safety (28.1%) was another reason given by the participants, which explicitly stated that sidewalks do not provide adequate security for some urban users in some hours of the day. Insecurity could be due to various reasons, such as lack of adequate lighting, sidewalks covered by shrubs and tall trees, narrow pedestrian width, especially at night, resulting in fear for young women and elder people to perceive safety. For example, one of the local businesses in the focus group mentioned some of the factors affecting the security and safety of sidewalks. He stated that: "sidewalk safety in Kargar Street which is one of the main and longest streets in Amirabad neighbourhood has been divided into 3 categories based on land use pattern. From Jalal Al-Ahmad to 13th street land use is residential, most of the time street sidewalks are busy with pedestrians and it is safe enough at any time of the day. From 14th to 17th land use pattern is mostly residential, commercial and with educational organizations that street sidewalks are relatively not lighted enough. Due to the presence of university residences which prohibit students to stay outside after 9 p.m. for their safety reasons, this tremendously reduces the number of people on sidewalks during the evening. And finally, from 18th to 20th, sidewalks are dark at night time and are free of pedestrians after sunset. Mixed land use can make a city more desirable and livable for all pedestrians to walk at any time without being injured or robbed. But due to the lack of integrated land use planning many residents are not able to use neighbourhood resources and pedestrian physical infrastructures".

Accordingly, lack of sidewalks, insufficient lighting, carrying things (shopping bags), disability issues and walking with children 27.1%, 20.8%, 16.7%, and 10.4% (for both disability and walking with children) were identified as an important preventive walking factors among the participants, respectively.

The next question measures distance to public transportation. This question assesses the walking distance from residence place to first public transportation. On the other hand, it also measures whether a distance to public transportation affects transportation mode or not. Interestingly, 60.0% of the respondents indicated that there is only a 5-minute walk from their home to public transportation. This suggests that by reducing the distance to public transport, the willingness individuals to use car-dependency approach could be reduced. Accessibility and affordability might be two important factors contributing to individuals willingness to use public transit. However, as noted earlier, the greatest tendency has been to use private vehicles, which in turn causes a huge amount of traffic and air pollution. Walking to transport is mainly for reaching the workplace. Therefore, it can be said that the most fundamental reasons for people to walk, especially in metropolitan cities, is walking to work, which is strongly dependent on the distance from the place of residence to the public transport.

At the end of the second part of the survey, questions were asked to assess the importance of each factor individually. Figure 15 demonstrates how important each individual factor is for the respondents and how the sample population rated each factor as well. The result from the factors contributing in walking mode choices demonstrates that safety is a significant factor (92.6%) for the Amirabad respondents that need to be addressed by the planners and policy makers.

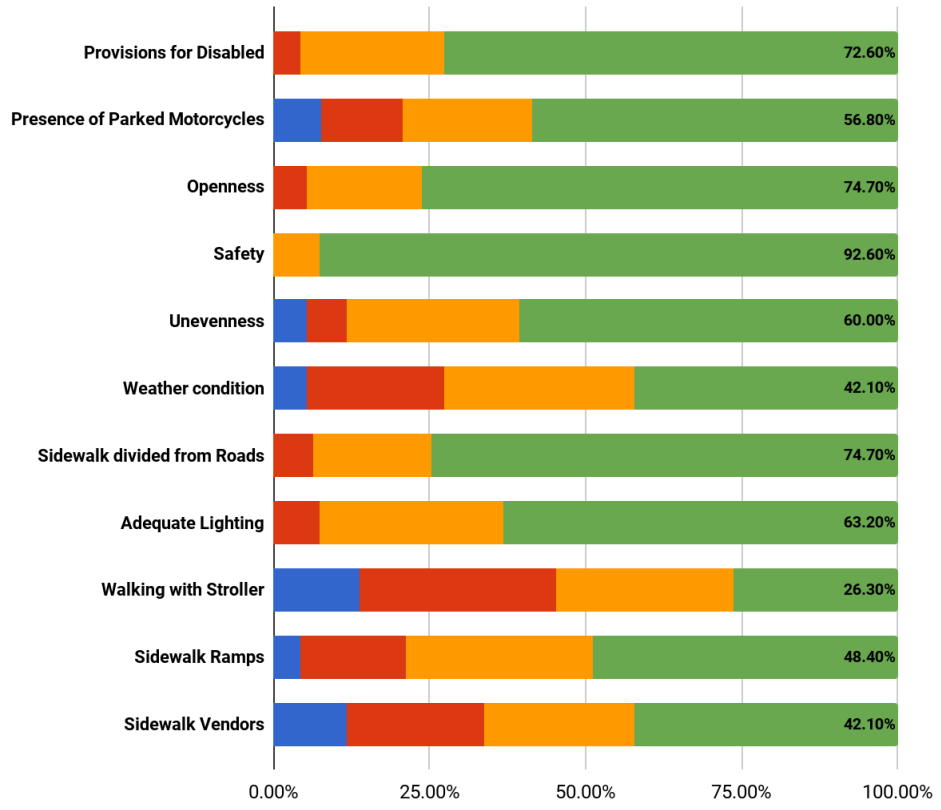

Figure 15 Importance of factors contributing to walking mode
Source: author's work

4.2. Cross-tabulation Analysis

The results from previous studies have explored the role of the neighbourhood socio-demographic and built environment on the pattern of walking behaviour of urban residents. For example, according to Hearst et al. (2013) the level of walking is strongly associated with household and individual level sociodemographic characteristics, "that associations between socioeconomics and walking observed at the area-level will be reduced by household and individual-level characteristics" (p.3). Furthermore, to address a number of these gaps, this section examines and analyzes the relationship between some of the socio-demographic predictors of

walking including occupation, age, street type, income, and education, and how these relationships change over time and location.

4.2.1. Employment Status and Main Reason to Walk

The results from occupation and employment status demonstrate that just two-thirds of respondents (72.3%) were classified an "occupation and employment" status compared with a lower percentage of respondents who are either engaged in home duties (e.g. housewives) or retired. The likelihood of walking tended to be higher among residents with an occupation. As stated earlier, walking to work was the main reason among respondents. About 30.5% of the sample population with the highest walking rate asserted that walking to work is the main reason for them to walk daily. Turrell et al. (2014) found that minutes of walking for transport, leisure, physical activity and errands were significantly higher among the non-employed than employed residents, which is in contrast with what we have observed in our study area.

Figure 16 examines an observed association between occupation status and the main reasons for walking. It is important to note that the initial survey questionnaire was comprised of four employment categories (#1: housewife, #2: retired, #3: businesses, #4: government jobs). An adjustment has been employed, and businesses and government jobs were merged and recoded into one category (#3). The results have shown that there is strong evidence of a relationship between employment status and walking. The significant associations between these two variables predicting employment status has a large impact on the level of walking. However, it seems that the level of walking is strongly related to utilitarian purposes, and apparently not related to the level of physical activity. Table 7 presents the cross tabulation results, Fisher's Exact Test (28.275) and P value (0.000).

Table 7 Cross tabulation between employment status and reason to walk
Source: author's work

Chi-Square Tests						
	Value	dr	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. 1-sided)	Point Probability
Pearson Chi-Square	27.620*	8	.001	.001		
Likelihood Ratio	32.918	8	.000	.000		
Fisher's Exact Test	28.275			.000		
Linear-by-Linear Association	5.132	1	.023	.015	.015	.000
N of Valid Cases	94					

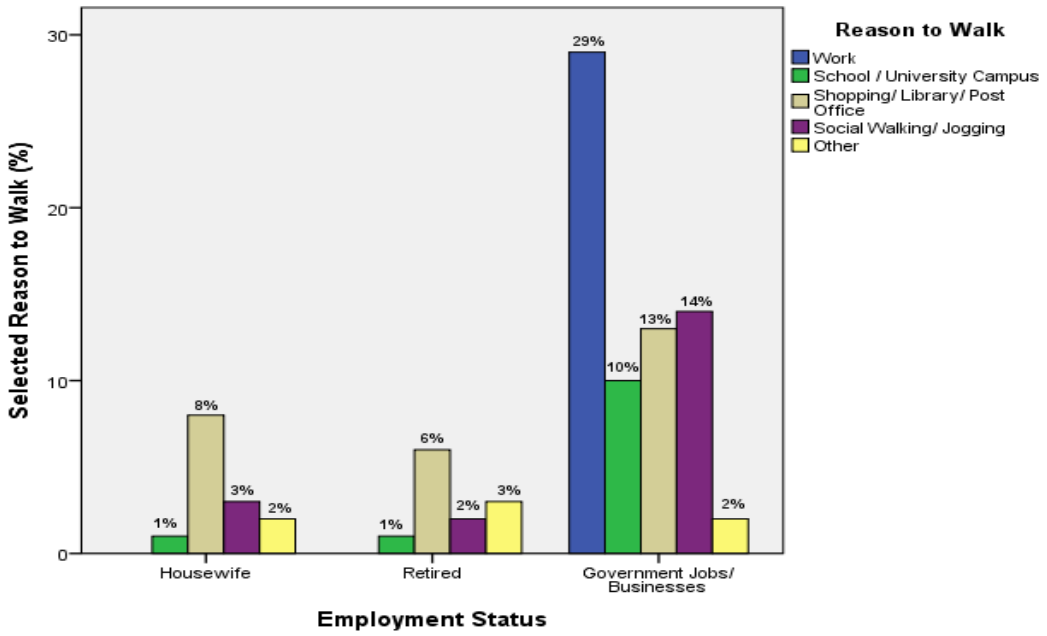

Figure 16 Association between occupation and reason to walk
Source: author's work

4.2.2. Age and Transportation Mode Preferences

Age is found to be one of the most significant correlated factors with a level of walking among all urban users. Table 8 presents Fisher's Exact Test (24.625), and P value (0.002). Figure 17 demonstrates an association between age variable and transportation mode preferences for respondents of the study area. The outcomes are displayed with an increase in age, the propensity to choose walking as a primary mode of transportation has increased. This finding is in contrast with a previous study in which younger persons walked more on average per week than their older counterparts, "an age-related decline partly associated with concomitant declines in health and functional status" (Turrell et al., 2014, p.14). The majority of respondents prefer single-vehicular transportation mode (45.3%), about 41.1% of the respondents inclined public transportation in a lesser degree, and surprisingly walking with 13.7% selected as lesser frequency than the car and public transportation. The car-dependency travel option in age between 25-34 was strong due to an increase in changing of built environment (Shoorcheh et al., 2016).

Table 8 Cross tabulation between age and transportation mode
Source: author's work

Chi-Square Tests						
	Value	dr	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. 1-sided)	Point Probability
Pearson Chi-Square	25.622*	10	.004			
Likelihood Ratio	28.016		.002	.003		
Fisher's Exact Test	24.625			.002		
Linear-by-Linear Association	1.513	1	.219	.226	.120	.020
N of Valid Cases	95					

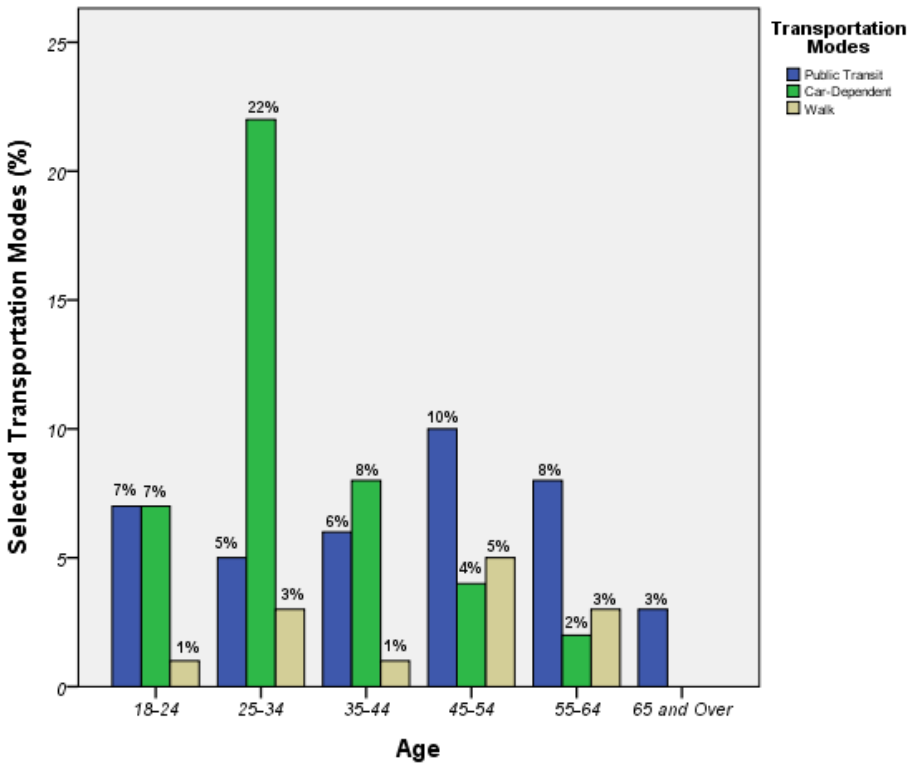

Figure 17 Association between age and transportation modes
Source: author's work

4.2.3. Street Type and Sidewalk Conditions

Street type and sidewalk condition are two other important factors that may impact the level of walking. "The region's settlement pattern has represented the lifestyle preferred by most Tehran families in the past few decades" (Shoorcheh et al., 2016, p.38). Table 9 shows that the correlation between street type (e.g. alley, collector, and arterial roads) and sidewalk condition is statistically significant. Fisher's Exact Test (12.088), and P value (0.035). Also, the results have shown that sidewalks on collector roads experience poor conditions (29%) compared to other road types and arterial roads where the sidewalks are in a better condition. Figure 18 presents a detailed overview of association between sidewalk condition and street type as well.

Table 9 Cross tabulation between sidewalk condition and street type
Source: author's work

Chi-Square Tests						
	Value	dr	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. 1-sided)	Point Probability
Pearson Chi-Square	12.655*	6	.049	.044		
Likelihood Ratio	13.801	6	.032	.046		
Fisher's Exact Test	12.088			.035		
Linear-by-Linear Association	4.686	1	.030	.031	.019	.008
N of Valid Cases	95					

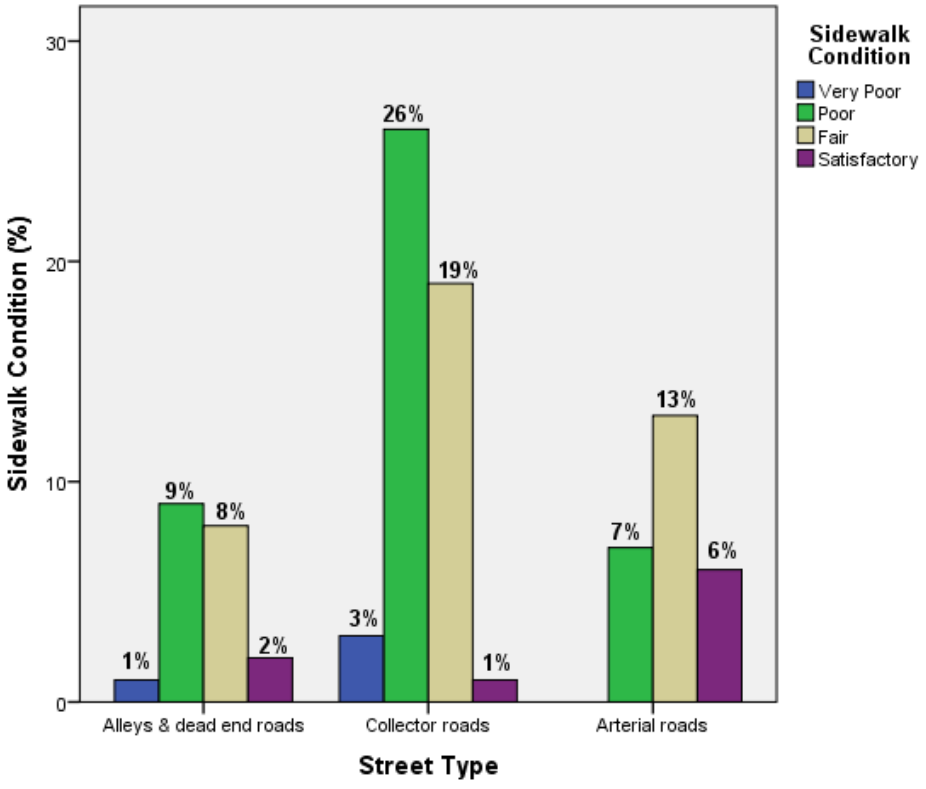

Figure 18 Association between sidewalk condition and street type
Source: author's work

4.2.4. Household Income and Transportation Mode Preferences

Household income characteristics influence the travel mode choice and travel behaviour of different urban residents. Members of households earning between 2,500,000 Tomans and over had a significantly lower rate of walking as an active and preferred mode of transportation. The analysis found that there is no evidence of an association between travel mode choice and household income, which is consistent with some of the previous studies. These studies have suggested that more members of the lowest income households were classified as walkers than members of the highest income households. This gap might be a result of a limited access of low-income households to a motor vehicle, although time constraints in high income households due to longer working hours might influence on the level of walking. (Turrell et al., 2014, p.16; Turrell, Haynes, Wilson, & Giles-Corti, 2013). The results of this study have found that members of lower income households (6,00,000 Tomans to 1,500,000 Tomans) more likely prefer a motor-vehicle (car-dependent) transportation mode which is in contrast with what Turrell et al. (2014) reported earlier. It means that besides income level, there might be other factors correlated with walking such as the built environment and socio-demographic characteristics. Table 10 demonstrates the cross tabs between household income and transportation mode preferences, Pearson Chi-Square (5.590), and P value (0.471). This reveals the facts that there is no strong association between household income and transportation mode preferences. Figure 19 shows the results from the non-association between transportation mode and household income in Amirabad neighbourhood.

Table 10 Cross tabulation between household income and transportation mode
Source: author's work

Chi-Square Tests			
	Value	dr	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.590*	6	.471
Likelihood Ratio	7.337	6	.291
Linear-by-Linear Association	.284	1	.591
N of Valid Cases	90		

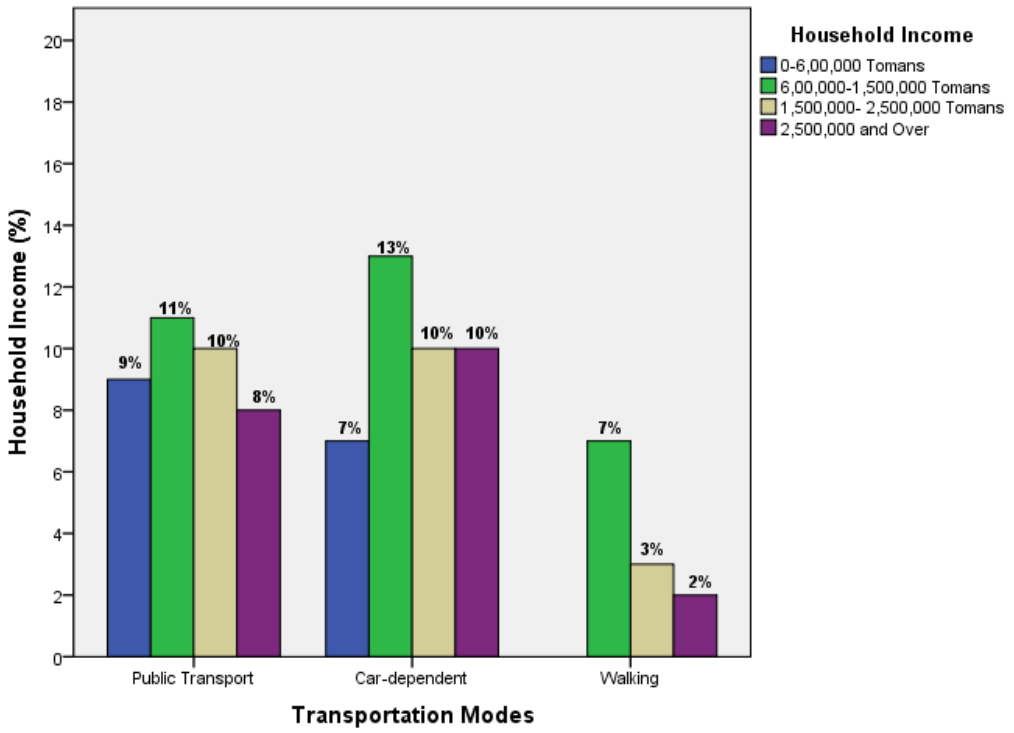

Figure 19 Non-association between household income and transportation mode
Source: author's work

4.2.5. Education Attainment and Allocated Time to Walk

The results from table show that there is no strong evidence of a relationship between education attainment and walking for utilitarian purposes and/or physical activity among our participants. According to table 11, Fisher's Exact Test (7.189) and the P value of (0.869). Although, the results after adjustment indicated that respondents with lower levels of education (some high school and bachelor degree), between 18 to 35 are classified to be more physically active and with more dedicated time to walk compared with masters and P.h.D. degree categories. According to the increase in education attainment, the walking rate gradually declined which is totally in contrast to what other studies have reported. According to Turrell et al. (2014), "lower educated groups were significantly more likely classified as never walkers. Higher educated groups tend to have a greater level of awareness of the links between motorised travel and environmental problems (e.g. pollution, greenhouse gas emissions) which could promote increased levels of walking to transport among this group. They suggest that lower educated groups may be less positively pre-disposed to walk as they are less likely to perceive the health benefits of an active lifestyle, including participating in leisure time, which possibly reflects a lower responsiveness to health promotion messages" (p.15). Moreover, there were no significant interactions between education and time allocation for walking. Other studies found that physical activity and walking in younger groups are reduced in lower educated groups due to family responsibilities (Droomers et al., 2001). Regardless of the role of the built environment and urban planning design, the reason behind these findings may be due to social, economic, cultural and environmental perspectives in the different study area that would tremendously affect the results. Figure 20 presents a non-association between education attainment and allocated time to walk.

Table 11 Cross tabulation between education attainment and allocated time to walk
Source: author's work

Chi-Square Tests						
	Value	dr	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. 1-sided)	Point Probability
Pearson Chi-Square	7.471*	12	.825	.850		
Likelihood Ratio	9.172	12	.688	.797		
Fisher's Exact Test	7.189			.869		
Linear-by-Linear Association	.496	1	.481	.493	.256	.027
N of Valid Cases	94					

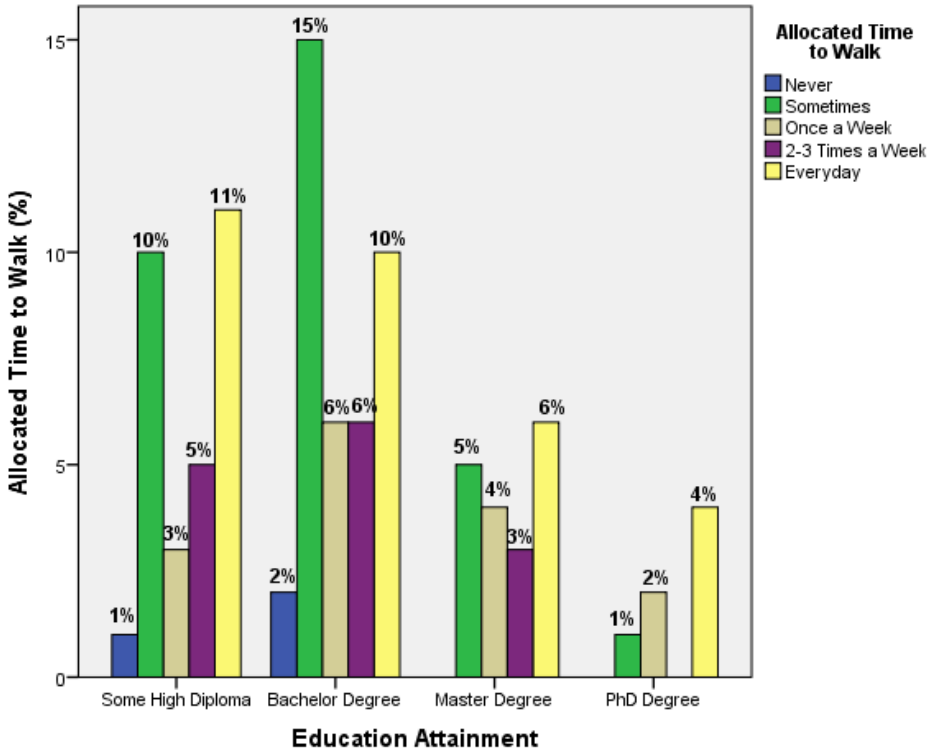

Figure 20 Non-association between education attainment and allocated time to walk
Source: author's work

4.3. CE Results

A Choice Experiment (CE) instrument has been used in this study to determine respondents' preferences for different sidewalk alternatives. As stated earlier, respondents' preference choices enable the policy makers to understand what attributes are more important among other attributes. Table 12 demonstrates 24 sidewalk choice alternatives used in the study. Each choice is comprised of attributes and their levels that have been created by the SPSS software. For the ease of data analysis, the total number of respondents who selected each sidewalk choice are provided under respondent's decision column. A total of 12 choice cards (24 choices) was distributed unequally among Amirabad neighbourhood residents, of which (from the total of 95 sample population), 33 and 62 people responded to version 1 and 2 of the survey questionnaire, respectively. Both versions of the survey questionnaires (one in Farsi and one in English) have been included in Appendix C. For instance, the first sidewalk choice card has been designed with adequate lighting, wide, without curbs and bollards, the current condition of sidewalk uneven and the municipality cost for each square meter is 1, 00,000 Tomans was chosen only by 14 out of 33 respondents for the first version of the survey.

Table 12 Respondents choices of different sidewalk alternatives
Source: author's work

	Attributes and their Levels					Respondent's Decision	
Sidewalk Choices	**Brightness**	**Width**	**Curbs and Bollards**	**Evenness**	**Cost**	**Yes**	**No**
Choice 1	Adequate Lighting	Wide	Without	Uneven	1,00,000 Tomans	14	19
Choice 2	Not Adequate Lighting	Wide	Without	Uneven	0 Tomans	10	22

Choice 3	Not Adequate Lighting	Wide	Without	Even	2,00,000 Tomas	11	21
Choice 4	Adequate Lighting	Wide	With	Uneven	0 Tomans	13	19
Choice 5	Not Adequate Lighting	Wide	Without	Even	3,00,000	16	16
Choice 6	Not Adequate Lighting	Narrow	Without	Even	3,00,000 Tomas	4	28
Choice 7	Not Adequate Lighting	Wide	With	Uneven	1,00,000 Tomas	11	21
Choice 8	Not Adequate Lighting	Narrow	With	Even	0 Tomas	8	24
Choice 9	Not Adequate Lighting	Wide	Without	Uneven	3,00,000 Tomans	9	23
Choice 10	Adequate Lighting	Narrow	With	Uneven	3,00,000 Tomans	8	24
Choice 11	Not Adequate Lighting	Narrow	With	Even	1,00,000 Tomans	6	26
Choice 12	Adequate Lighting	Narrow	Without	Even	0 Tomas	20	12
Choice 13	Adequate Lighting	Wide	Without	Even	3,00,000 Tomans	41	22
Choice 14	Adequate Lighting	Narrow	With	Uneven	0 Tomans	10	53
Choice 15	Not Adequate Lighting	Wide	Without	Uneven	2,00,000 Tomans	19	44
Choice 16	Not Adequate Lighting	Narrow	Without	Even	0 Tomans	21	42
Choice 17	Adequate Lighting	Narrow	Without	Even	2,00,000 Tomans	36	27
Choice 18	Not Adequate Lighting	Narrow	Without	Uneven	1,00,000 Tomans	9	54
Choice 19	Adequate Lighting	Narrow	With	Uneven	2,00,000 Tomans	26	37
Choice 20	Not Adequate Lighting	Narrow	With	Uneven	2,00,000 Tomans	11	52
Choice 21	Not Adequate Lighting	Narrow	With	Uneven	3,00,000 Tomans	14	49
Choice 22	Not Adequate Lighting	Wide	With	Even	0 Tomans	26	37
Choice 23	Adequate Lighting	Narrow	Without	Even	3,00,000 Tomans	16	47
Choice 24	Adequate Lighting	Narrow	Without	Even	1,00,000 Tomans	31	32

A logistic regression method was applied in order to model and estimate participants' preferences when dependent variables are a discrete variable (Azimi & Asgary, 2013). Figure 21 presents the logistic regression results on the basis of 1140 observed choices. This table is comprised of attributes, estimated coefficient of a simple random utility, standard error, and significance level. Estimated coefficient examines an impact of attributes on individual sidewalk choices. Also, a significance level examines whether estimated coefficients are statistically significant or not.

Logistic Regression Results

	B	S.E.	Wald	df	Sig.	Exp (B)
Sidewalk Lighting	.777	.136	32.776	1	.000	2.174
Sidewalk Width	.700	.141	24.771	1	.000	2.013
Sidewalk Curb and Bollard	-.108	.154	.496	1	.481	.897
Sidewalk Uniformity and Leveling	.601	.144	17.470	1	.000	1.825
Municipality Cost (Meter Square)	.000	.000	.250	1	.617	1.000
Constant	-3.480	.542	41.183	1	.000	.031

Figure 21 Logistic regression results
Source: author's work

"Positive coefficient values indicate that increasing the attribute value increases an individual's welfare and consequently they have a positive utility for that increase. Negative coefficient values indicate that respondents have a negative utility for increasing the associated attribute value based on the reduction in welfare that it would represent for them" (Azimi & Asgary, 2013, p.253). The results from the logistic regression have suggested that the 'cost' and 'curbs and bollards' ($p>.05$) values were less important for Amirabad residents, however, the other

attributes remained important ($p<.05$). The positive sign for the 'lighting', 'width', and 'sidewalk evenness' coefficient value indicate that sidewalks with adequate lighting and brightness, wide and evenness increase residents' welfare and consequently Amirabad residents have a positive utility for that augment. The amount of 'cost' for constructing a sidewalk per square meter by the municipality was not found to be significant ($P= 0.617$). But since the cost will be paid by the municipality and there is no incurring cost for the citizen to pay immediately, they are not sensitive to choosing the different cost levels. The negative sign for the 'curb and bollard' coefficient value indicates that this value is not significant and that respondents' welfare is not dependent on the increase or decrease in curb and bollard value. This can be partially explained by the fact that installation of curb and bollard have been a recent sidewalk safety feature in land use mix design that not everyone is familiar with. According to these findings, it can be concluded that sidewalk lighting and brightness is the first priority of Amirabad neighbourhood. After that, sidewalk width, sidewalk uniformity, and leveling were in second, and third priorities.

5. Conclusion

Sidewalks are a vital component of pedestrian physical infrastructure that in recent years due to uncontrolled urban growth have encountered problematic and complicated conditions. Sidewalk improvements, if integrated with a pedestrian-oriented approach, can significantly increase people's walking behaviours. Undoubtedly, pedestrians are a vulnerable group of urban users, particularly in developing countries that are at higher risk of accidents and injuries. The vulnerability of pedestrians has resulted from the lack of adequate sidewalks. In other words, pedestrians are vulnerable because sidewalk safety has been neglected and undermined in a planning agenda. In addition, due to the 'financial restriction, lack of education, ineffectiveness, unskillful and irresponsible authorities have caused Iran to not have specific pedestrian safety policies' (Heidari Kani, 2015).

An uneven sidewalk, poor surface pavement, no sufficient lighting, narrow sidewalk, and, most importantly, the lack of separation between pedestrian path and traffic led to people avoiding walking even for short distances. Consequently, such poor conditions caused a trend toward car-dependency, high traffic congestion, and health related issues. The results show that proper sidewalk improvement and an equal distribution of sidewalk facilities can play a significant role in increasing urban residents physical activity and move toward walking. Pedestrian sidewalk infrastructure that encourages a safe walking environment must be implemented in an urban planning agenda. Tehran's comprehensive plan needs to address pedestrian safety problems and implement necessary reforms to create a safe and easy traffic movement for all urban users particularly for people with mobility disabilities. So proper planning would lead to making a city more livable, walkable, vibrant and sustainable. However, it is important to note that, public participation and bringing residents' perceptions in a planning process can help to reduce conflicts among stakeholders, planners, and existing policies. The pedestrian-oriented approach must be organized in such a way that all the resources distribute equally, regardless of gender, age,

education and income level of individuals. Therefore, a comprehensive and inclusive pedestrian safety must be introduced by city planner and governmental authorities that aims to provide sustainable walkable city plan. More studies on valuing sidewalk elements in different provinces of Iran will be needed in order to understand the effect of different sidewalk elements and its relations to socio-demographic characteristics of the study area. Future studies will help the policy makers and urban planners to implement the necessary policy for all urban residents.

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Appendix A- Invitation Letter

Original English Invitation Letter

Dear Amirabad Residents, January 26, 2017

I am currently a York university student at Toronto, Canada, studying on valuing sidewalk attributes contributing to the level of walking attitudes and its impact on health benefits of Amirabad residents. The main goal of this project is to understand the most relevant and significant factors which are based on Amirabad residents perceptions and experiences from walking transportation mode. However, I am really interested in gaining information from all residents, no matter walk or choose other transportation modes. Your input will help extensively to change the walking behaviours of residents and moving toward a more walking or pedestrian oriented approach in Amirabad neighbourhood.

You are invited to take part in a focus group study which will be held based on participants availability. The focus group will be a short group discussion between 30 to 45 minute long concerning possible sidewalk characteristics or attributes that may affect pedestrian safety and the amount of walking or physical activity of residents. Participants are more than welcome to share their experiences or recommendations that may help to improve walking transportation mode.

For an appreciation participants will receive a gift on a day of a discussion group.

If you are willing to participate in a focus group study please contact me via my email address, bbakhit@my.yorku.ca or you can call me at 09122858253.

If you have more questions regarding the research study details please contact me at bbakhit@my.yorku.ca

Thank you for your great support and effort for completing my research study!

Sincerely,

Behnaz Bakhit

Original Farsi Invitation Letter

ساکنین محترم امیراباد

من دانشجوی دانشگاه یورک در تورنتو کانادا هستم، ودرحال حاضربر روی ویژگی های پیاده روها و تاثیر آنها بر سلامتی ساکنان امیرآباد مطالعه و تحقیق میکنم. هدف اصلی از پرداختن به این موضوع، شناخت عوامل مرتبط و مهم که بر مبنای ادراکات و تجربیات ساکنان امیرآباد از پیاده روهای محل سکونت خود دارند میباشد. با این حال، من واقعا علاقه مند به کسب اطلاعات از همه ساکنان منطقه امیراباد هستم ، بدون درنظرگرفتن به اینکه علاقمند به پیاده روی و یا دیگر حالت های حمل و نقل هستند. اطلاعات وتجربیات شما به طور گسترده ای میتواند کمک بسزایی در پیشبرد این تحقیق و حرکت به سمت پیاده روی یا پیاده روی بیشتر در محله امیرآباد میکند.

از شما دعوت میشود تا دراین مطالعه گروهی متمرکز شرکت نمایید. زمان برگذاری این گردهمایی کاملا براساس زمان مورد تایید شما ودیگرشرکت کنندگان برنامه ریزی خواهد شد. گروه متمرکز یک بحث کوتاه بین 30 تا 45 و در مورد ویژگی های پیاده رو یا ویژگی هایی که ممکن است ایمنی عابر پیاده و میزان فعالیت پیاده روی یا فعالیت فیزیکی ساکنین را تحت تأثیر قرار دهد خواهد بود.از شرکت کنندگان استقبال میشود تا تجربیات خود و یا توصیه هایی را که می توانند به بهبود پیاده روها و همین طورپیاده روی کمک کنند، به اشتراک بگذارند.

برای قدردانی از شرکت کنندگان برای همکاری در این موضوع تحقیقاتی، یک هدیه دریافت خواهید کرد .

اگر مایل به شرکت در گروه متمرکزهستید، لطفا از طریق آدرس ایمیل من در زیر ویا با شماره 09122858253 تماس بگیرید.

اگر سوالات بیشتری در رابطه با جزئیات مطالعه دارید، لطفا با این ایمیل ادرس با من در تماس باشید.

bbakhit@my.yorku.ca

با تشکر از حمایت و تلاش شما برای تکمیل مطالعات پژوهشی

با تشکر،

بهناز بخیت

Appendix B- Consent Form

Original English Consent Form

Valuing Tehran's sidewalk's elements

Conducted By:
Behnaz Bakhit
Faculty of Environmental Studies
York University, Toronto, Ontario
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January 2017

Survey Informed Consent Letter

Date: January 5, 2017

Study Name: Survey of Valuing Tehran's Sidewalk's Elements

My name is Behnaz Bakhit and I am a graduate student in the Environmental Studies Program at York University in Toronto, Canada, working with my faculty supervisor, Professor Ali Asgary in the Faculty of Liberal Arts and Professional Studies, and also with my faculty advisor, Professor Peter Timmerman in the faculty of Environmental Studies. I am conducting this research as part of my master's project and my goal is to assess the valued that Tehran residents put for different attributes of street sidewalks using a choice experiment method.

Access to walkable neighborhoods is one of the main aspects of the UN sustainable development goals that emphasizes on the human health and the physical environment. To enhance sidewalk design, reprioritizing of the sidewalk values and features must be implemented to improve both the built environment and urban residents' health.

We do not foresee any risks or discomfort from your participation in the research. Your participation in this survey is entirely voluntary and you may choose to stop participating at any time. Your responses in my research study will be archived anonymously. The entire information will be used for the research study purposes and will not be used for any other purposes. A copy of the final research will be available to you at your request.

This survey will not take more than 10 minutes of your time. In many cases, the survey questions are designed to be answered with either a tick or by placing a circle around the desired response. If a question is difficult for you to answer, please give us your best guess. Your decision to stop participating, or to refuse to answer particular questions, will not affect your relationship with the researchers, York University, or any other group associated with this project. In the event you withdraw from the study, all associated data collected will be immediately destroyed wherever possible.

The data will be collected either by digital device (tablet) or hard copy questionnaire. A digital and hard copy of data will be safely stored in a locked facility and only research staff will have access to this information. The data will be stored for a minimum of one year and after the study both digital and hard copy will be destroyed and shredded, respectively. Confidentiality will be provided to the fullest extent possible by law.

If you have any question or concern regarding the results and your role in the study, please feel free to contact my supervisor, Dr. Ali Asgary, either by telephone at (416) 736-2100 ext 22879 or by e-mail asgary@yorku.ca. This research has been reviewed and approved by the FES Research Committee, on behalf of York University, and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines. If you have any questions about this process, or about your rights as a participant in the study, please contact the Sr. Manager & Policy Advisor for the Office of Research Ethics, 5th Floor, Research Tower, York University (telephone 416-736-5914 or e-mail ore@yorku.ca).

If you agree to allow your name or identifying information to be included in my presentation, publication or resulting study, please sign and date below. Otherwise, your identity will not be disclosed in any published material resulting from the study.

Signature _____ **Date** _____

Participant

Signature _____ **Date** _____

Principal Investigator

Use this section if imagery (photographs or video) will be taken of participants and used in teaching or dissemination of research.

I,_____agree to allow video and/or [digital images or photographs] in which I appear to be used in teaching, scientific presentations and/or publications with the understanding that I will not be identified by name. I am aware that I may withdraw this consent at any time without penalty.

Signature_____ **Date**_____

Participant

Original Farsi Consent Form

ارزیابی فاکتورهای موثر در پیاده روهای منطقه امیراباد در تهران

بهناز بخیت
دانشکده مطالعات محیط زیستی
دانشگاه یورک، تورنتو، انتاریو
دانشجوی کارشناسی ارشد محیط زیست
bbakhit@my.yorku.ca
ژانویه 2017

اسم من بهناز بخیت است و من دانشجوی کارشناسی ارشد مطالعات محیط زیستی در دانشگاه York در تورنتو کانادا هستم. در این تحقیق من با دیگر اساتید، پروفسور علی عسگری در دانشکده هنر های زیبا و مطالعات حرفه ای، و همچنین پروفسور پیتر تیمرمن در دانشکده مطالعات محیط زیستی همکاری می کنم. من این تحقیق را به عنوان بخشی از پروژه کارشناسی ارشد انجام می دهم و هدف از این تحقیق این است تا میزان اهمیت و ارجحیت شهروندان منطقه امیراباد را برای صفات متفاوت پیاده روها با استفاده از روش انتخاب تجربی ارزیابی نمود.

دسترسی به محله های قابل پیاده رو یکی از جنبه های اصلی اهداف توسعه پایدار سازمان ملل است که بر سلامت انسان و سلامت محیط زیست تأکید دارد.

ما هیچ ریسک یا ناراحتی از مشارکت شما در تحقیق را پیش بینی نمی کنیم. مشارکت شما در این نظرسنجی کاملا داوطلبانه است و شما می توانید تصمیم بگیرید که در هر زمان از ادامه شرکت خودداری کنید . پاسخ های شما در تحقیقات من به صورت ناشناس بایگانی خواهد شد. کل اطلاعات برای اهداف تحقیق مورد استفاده قرار می گیرد و به هیچ وجه مورد استفاده دیگری قرار نخواهد گرفت. یک کپی از تحقیق نهایی بنا به خواست شما در دسترس شما خواهد بود.

این نظرسنجی بیش از 10 دقیقه نخواهد بود. در بسیاری از موارد، سوالات به این صورت طراحی شده اند که با یک تیک ویا با قرار دادن یک دایره در اطراف پاسخ دلخواه پاسخ داده میشود. اگر در پاسخ به سوالات دچارتردید هستید، لطفا بهترین حدس را بزنید. هرگونه تصمیم ازسمت شما در جهت ادامه ندادن و یا خودداری ازشرکت در پرکردن پرسشنامه ، در ارتباط شما با محققان دانشگاه یورک یا هر گروه دیگر مرتبط با این پروژه را تحت تاثیر قرار نخواهد داد. در صورت عدم و یا خروج از ادامه همکاری شما، تمام داده های مربوط بلافاصله از بین برده خواهند شد.

در داده ها توسط دستگاه دیجیتال (تبلت) یا پرسشنامه چاپ شده جمع او ری خواهند شد. یک نسخه دیجیتالی و کپی داده ها در یک مکان مطمین در دانشکده ذخیره و حفظ می شود و فقط محققین به این اطلاعات دسترسی خواهند داشت. داده ها برای حداقل یک سال ذخیره می شوند و پس از آن، هر دو نسخه دیجیتال و هارد دیسک شکسته و بازیافت می شوند.

محرمانه بودن اطلاعات حدالمقدور وبه صورت قانونی اجرا می شود.

اگر درمورد نتایج و نقش شما در این تحقیق سوال و یا نگرانی دارید، لطفا با دکترعلی عسگری طریق ا از طریق تلفن ۴۱۶۷۳۶۲۱۰ داخلی۲۲۸۷۹ تماس بگیرید .

این پرسشنامه مطابق با استانداردهای مطالعات تحقیقاتی درکشور کانادا است. اگر در مورد این فرایند یا حقوق خود به عنوان یک شرکت کننده در این تحقیق سؤال دارید، لطفا با مشاور ارشد و مشاور سیاسی دفتر تحقیقاتی در دانشگاه یورک، ساختمان تحقیقات، طبقه پنجم تماس بگیرید. ore@yorku.ca ۴۱۶۷۳۶۵۹۱۴

در صورت موافقت درآوردن نام و یا مشخصات شما در مقالات ، یا مطالعات حاصل از آن، لطفا تاریخ و امضا خود را در زیر وارد نمایید. در غیر این صورت، هویت شما در مطالعات منتشرشده قید نخواهد شد.

تاریخ امضا

شرکت کننده

تاریخ امضا

محقق اصلی

در صورت استفاده از تصاویر وعکس یا ویدیو شرکت کنندگان در جهت استفاده در تدریس یا انتشار پژوهش از این قسمت استفاده نمایید.

من موافقت میکنم که ویدیو و / یا [تصاویر دیجیتال یا عکس] را که در آن به منظور تدریس، سخنرانیهای علمی و / یا نشریات ولی بدون درج نام و مشخصات من مورد استفاده قرار گیرد.

تاریخ امضا

Appendix C- Survey Questionnaire

Original English Survey Questionnaire Version 1 & 2

Survey Questionnaire

Section A: General Questions

How many years have you lived in this neighbourhood? Years

What is your age group?

☐ 18-24 ☐ 25- 34 ☐ 35-44 ☐ 45-54 ☐ 55-64 ☐ 65 and over

What is your gender?

☐ Female ☐ Male

What is the highest level of education that you completed?

☐ Some high school ☐ Diploma ☐ Technician ☐ Bachelor ☐ Master ☐ Ph.D.

What is your occupation?

☐ Housewife ☐ Retired ☐ Businessman/woman ☐ Government job

What is your monthly income?

☐ 0-600,000 Tomans ☐ 600,000-1500,000 Tomans ☐ 1500,000-2500,000 Tomans ☐ 2500,000 and Over

In what type of road classification your house is located?

☐ Alley/dead end ☐ Local and Collector road ☐ Arterial road (major/minor)

In what type of house do you live?

☐ Apartment ☐ High-rise building ☐ House

What is your favourite transportation choice?

☐ Public transportation ☐ Car-dependent ☐ Walking

Do you drive? ☐ Yes ☐ No

If yes, please indicate which of the following options would be your major reason to drive?

☐ Drive to work ☐ Drive to shopping centre ☐ Drive to school/ university ☐ Other

How important is for you to include walking in your daily schedule?

☐ Not at all important ☐ Slightly Important ☐ Important ☐ Fairly Important ☐ Very Important

How often do you walk?
☐ Never ☐ Sometimes ☐ Once a week ☐ 2-3 Times Per week ☐ Everyday

Section B: Sidewalk Values

How do you describe a current condition of your neighbourhood's sidewalk?

☐ Very poor ☐ Poor ☐ Fair ☐ Satisfactory

Which of the following options would be your major reason to walk?

☐ Walking to work ☐ walking to school/University ☐ walking to stores/Library/post office ☐ Walking/ social walking/ jogging ☐ other

Have you ever experienced any of the following issues in your neighbourhood?

☐ sidewalk falling ☐ robbery ☐ jostling ☐ sexual assault ☐ none

Which of the following options may prevent you from walking?

☐ Weather condition ☐ Walking with kids ☐ Not adequate lighting
☐ No sidewalk ☐ No sidewalk safety ☐ Disability
☐ Crowd ☐ Unevenness ☐ Carrying things

How far is the nearest public transportation to your house?

☐ 5 minute walk ☐ 15-20 minute walk ☐ 20-30 minute walk ☐ More than 30 minute walk

Please indicate how important are the following factors in your walking?

Sidewalk Factors				
	Not at All Important	***Slightly Important***	***Important***	***Fairly Important***
Provisions for Disabled				
Presence of Parked Motorcycles				
Sidewalk Width and Openness				
Safety				

Unevenness				
Weather condition				
Sidewalk divided from Roads				
Adequate Lighting				
Walking with Stroller				
Sidewalk Ramps				
Sidewalk Vendors				

Section C: Choice of Sidewalk

In this section we are asking you to compare two types of sidewalk elements that differ in all or some of their attributes. Please compare them and choose the one you prefer most.

Choice card 1 (Version 1)

Which of the following sidewalk element scenarios do you favour? Option A and option B would provide you with daily			
Attributes	**Option A**	**Option B**	**Option 3**
Sidewalk Lighting	*Adequate Lighting*	*Not Adequate Lighting*	*Neither of these options*
Sidewalk Width	*Wide Sidewalk*	*Wide Sidewalk*	
Sidewalk Bollards and Curbs	*Without Bollards and Curbs*	*Without Bollards and Curbs*	
Sidewalk Evenness	*Uneven Sidewalk*	*Uneven Sidewalk*	
Sidewalk additional cost	*100,000 Tomans*	*0 Tomans*	
I would prefer: (Please tick as appropriate)	Option A	Option B	Option C

Choice card 2 (Version 1)

Which of the following sidewalk element scenarios do you favour? Option A and option B would provide you with daily			
Attributes	**Option A**	**Option B**	**Option 3**
Sidewalk Lighting	*Not Adequate Lighting*	*Adequate Lighting*	Neither of these options.
Sidewalk Width	*Wide Sidewalk*	*Wide Sidewalk*	
Sidewalk Bollards and Curbs	*Without Bollards and Curbs*	*WIth Bollards and Curbs*	

Sidewalk Evenness	*Even sidewalk*	*Uneven Sidewalk*	
Sidewalk additional cost	*200,000 Tomans*	*0 Tomans*	
I would prefer: (Please tick as appropriate)	Option A	Option B	Option C

Choice card 3 (Version 1)

Which of the following sidewalk element scenarios do you favour? Option A and option B would provide you with daily

Attributes	**Option A**	**Option B**	**Option 3**
Sidewalk Lighting	*Not Adequate Lighting*	*Not Adequate Lighting*	Neither of these options.
Sidewalk Width	*Wide Sidewalk*	*Narrow Sidewalk*	
Sidewalk Bollards and Curbs	*Without Bollards and Curbs*	*Without Bollards and Curbs*	
Sidewalk Evenness	*Even Sidewalk*	*Even Sidewalk*	
Sidewalk additional cost	*300,000 Tomans*	*300,000 Tomans*	
I would prefer: (Please tick as appropriate)	Option A	Option B	Option C

Choice card 4 (Version 1)

Which of the following sidewalk element scenarios do you favour? Option A and option B would provide you with daily

Attributes	**Option A**	**Option B**	**Option 3**

Sidewalk Lighting	*Not Adequate Lighting*	*Not Adequate Lighting*	*Neither of these options.*
Sidewalk Width	*Wide Sidewalk*	*Narrow Sidewalk*	
Sidewalk Bollards and Curbs	*With Bollards and Curbs*	*With Bollards and Curbs*	
Sidewalk Evenness	*Uneven SIdewalk*	*Even Sidewalk*	
Sidewalk additional cost	*100,000 Tomans*	*0 Tomans*	
I would prefer: (Please tick as appropriate)	Option A	Option B	Option C

Choice card 5 (Version 1)

Which of the following sidewalk element scenarios do you favour? Option A and option B would provide you with daily			
Attributes	**Option A**	**Option B**	**Option 3**
Sidewalk Lighting	*Not Adequate Lighting*	*Adequate Lighting*	*Neither of these options.*
Sidewalk Width	*Wide Sidewalk*	*Narrow Sidewalk*	
Sidewalk Bollards and Curbs	*Without Bollards and Curbs*	*With Bollards and Curbs*	
Sidewalk Evenness	*Uneven Sidewalk*	*Uneven Sidewalk*	
Sidewalk additional cost	*300,000 Tomans*	*300,000 Tomans*	
I would prefer: (Please tick as appropriate)	Option A	Option B	Option C

Choice card 6 (Version 1)

Which of the following sidewalk element scenarios do you favour? Option A and option B would provide you with daily

Attributes	**Option A**	**Option B**	**Option 3**
Sidewalk Lighting	*Not Adequate Lighting*	*Adequate Lighting*	*Neither of these options.*
Sidewalk Width	*Narrow Sidewalk*	*Narrow Sidewalk*	
Sidewalk Bollards and Curbs	*With Bollards and Curbs*	*Without Bollards and Curbs*	
Sidewalk Evenness	*Even SIdewalk*	*Even Sidewalk*	
Sidewalk additional cost	*100,000 Tomans*	*0 Tomans*	

I would prefer: Option A Option B Option C
(Please tick as appropriate)

Choice card 1 (Version 2)

Which of the following sidewalk element scenarios do you favour? Option A and option B would provide you with daily			
Attributes	**Option A**	**Option B**	**Option 3**
Sidewalk Lighting	*Adequate Lighting*	*Adequate Lighting*	*Neither of these options.*
Sidewalk Width	*Wide Sidewalk*	*Narrow Sidewalk*	
Sidewalk Bollards and Curbs	*Without Bollards and Curbs*	*With Bollards and Curbs*	
Sidewalk Evenness	*Even SIdewalk*	*Uneven Sidewalk*	
Sidewalk additional cost	*300,000 Tomans*	*0 Tomans*	
I would prefer: (Please tick as appropriate)	Option A	Option B	Option C

Choice card 2 (Version 2)

Which of the following sidewalk element scenarios do you favour? Option A and option B would provide you with daily			
Attributes	**Option A**	**Option B**	**Option 3**
Sidewalk Lighting	*Not Adequate Lighting*	*Not Adequate Lighting*	*Neither of these options.*
Sidewalk Width	*Wide Sidewalk*	*Narrow Sidewalk*	
Sidewalk Bollards and Curbs	*Without Bollards and Curbs*	*Without Bollards and Curbs*	
Sidewalk Evenness	*Uneven SIdewalk*	*Even Sidewalk*	
Sidewalk additional cost	*200,000 Tomans*	*0 Tomans*	

I would prefer: (Please tick as appropriate)	Option A	Option B	Option C

Choice card 3 (Version 2)

Which of the following sidewalk element scenarios do you favour? Option A and option B would provide you with daily

Attributes	**Option A**	**Option B**	**Option 3**
Sidewalk Lighting	*Adequate Lighting*	*Not Adequate Lighting*	*Neither of these options.*
Sidewalk Width	*Narrow Sidewalk*	*Narrow Sidewalk*	
Sidewalk Bollards and Curbs	*Without Bollards and Curbs*	*Without Bollards and Curbs*	
Sidewalk Evenness	*Even SIdewalk*	*Uneven Sidewalk*	
Sidewalk additional cost	*200,000 Tomans*	*100,000 Tomans*	

I would prefer: (Please tick as appropriate)	Option A	Option B	Option C

Choice card 4 (Version 2)

Which of the following sidewalk element scenarios do you favour? Option A and option B would provide you with daily

Attributes	**Option A**	**Option B**	**Option 3**
Sidewalk Lighting	*Adequate Lighting*	*Not Adequate Lighting*	*Neither of these options.*
Sidewalk Width	*Narrow Sidewalk*	*Narrow Sidewalk*	
Sidewalk Bollards and Curbs	*With Bollards and Curbs*	*With Bollards and Curbs*	

Sidewalk Evenness	*Uneven SIdewalk*	*Uneven Sidewalk*	
Sidewalk additional cost	*200,000 Tomans*	*200,000 Tomans*	
I would prefer: (Please tick as appropriate)	Option A	Option B	Option C

Choice card 5 (Version 2)

Which of the following sidewalk element scenarios do you favour? Option A and option B would provide you with daily			
Attributes	**Option A**	**Option B**	**Option 3**
Sidewalk Lighting	*Not Adequate Lighting*	*Not Adequate Lighting*	*Neither of these options.*
Sidewalk Width	*Narrow Sidewalk*	*Wide Sidewalk*	
Sidewalk Bollards and Curbs	*With Bollards and Curbs*	*With Bollards and Curbs*	
Sidewalk Evenness	*Uneven SIdewalk*	*Even Sidewalk*	
Sidewalk additional cost	*300,000 Tomans*	*0 Tomans*	
I would prefer: (Please tick as appropriate)	Option A	Option B	Option C

Choice card 6 (Version 2)

Which of the following sidewalk element scenarios do you favour? Option A and option B would provide you with daily			
Attributes	**Option A**	**Option B**	**Option 3**
Sidewalk Lighting	*Adequate Lighting*	*Adequate Lighting*	*Neither of these options.*

Sidewalk Width	*Narrow Sidewalk*	*Narrow Sidewalk*	
Sidewalk Bollards and Curbs	*Without Bollards and Curbs*	*Without Bollards and Curbs*	
Sidewalk Evenness	*Even SIdewalk*	*Even Sidewalk*	
Sidewalk additional cost	*300,000 Tomans*	*100,000 Tomans*	
I would prefer: (Please tick as appropriate)	Option A	Option B	Option C

Original Farsi Survey Questionnaire 1&2

فرم نظرسنجی 1

سوالات عمومی: بخش اول

۱. چه مدت هست که در این محله زندگی میکنید؟

۲. گروه سنی شما چیست؟

☐۱۸ تا ۲۴ ☐۲۵ تا ۳۴ ☐ ۳۵ تا ۴۴ ☐۴۵ تا ۵۴ ☐۵۵ تا ۶۴ ☐۶۵ و بالاتر

۳. جنسیت شما چیست؟

☐ زن ☐مرد

۴. آخرین مدرک تحصیلی که دریافت کرده اید چیست؟

☐ دیپلم ☐زیر دیپلم ☐فوق دیپلم ☐ لیسانس ☐ فوق لیسانس ☐دکترا ☐ دیگرموارد

۵. وضعیت شغلی شما چیست؟

☐ خانه دار ☐ بازنشسته ☐ شغل ازاد ☐کارمند

۶. درآمد ماهیانه شما در کدامیک ازدسته بندی های زیر قرار میگیرد؟(مبالغ به تومان می باشد)

☐ ۶۰۰۰۰۰ تا۱۵۰۰۰۰۰ ☐ ۱۵۰۰۰۰۰ تا 25۰۰۰۰۰ ☐ ۲۵۰۰۰۰۰ وبیشتر

۷. نوع خیابانی که خانه شما درآن واقع شده است چیست؟

☐کوچه بن بست ☐ کوچه های فرعی ☐خیابان اصلی

۸. نوع ساختمان محل سکونت شما چیست؟

☐ آپارتمان ☐برج یا مجتمع های مسکونی خانه ویلایی ☐

۹. مالک هستید یا مستاجر ؟

۱۰. کدام یک از حالت های حمل و نقل زیر را ترجیح می دهید؟

☐حمل و نقل عمومی ☐ اتومبیل شخصی ☐ پیاده روی

۱۱. آیا شما رانندگی میکنید؟ ☐بله ☐خیر

اگر بله، مهم ترین دلیل عمده شما برای رانندگی کدامیک ازموارد زیرمیباشد؟

☐رانندگی به محل کار ☐رانندگی به فروشگاههای خرید ☐ رانندگی به مدرسه / دانشگاه ☐ دیگر

۱۲. چقدر برای شما اهمیت دارد که پیاده روی را در برنامه روزانه خود جای دهید؟

☐ اهمیت ندارد ☐ کمی اهمیت دارد ☐مهم است ☐ نسبتا مهم ☐بسیار مهم

۱۳. هر چند وقت یکبار شما پیاده روی میکنید؟

☐هرگز ☐گاهی اوقات (کمتر از 2 ساعت در روز) ☐ یک بار در هفته ☐2- 3 بار در ☐هر روز

بخش دوم: پیاده روها

۱. وضعیت فعلی پیاده رو محل سکونت خود را چگونه ارزیابی میکنید؟

☐ بسیار مطلوب ☐ مطلوب ☐ نامطلوب ☐ بسیار نامطلوب

۲. کدام یک از موارد زیر <u>بیشترین</u> دلیل شما برای پیاده روی درطول روز میباشد؟

☐محل کار ☐مدرسه / دانشگاه ☐فروشگاه /خرید روزانه/ کتابخانه / اداره پست

☐ پیاده روی گروهی بصورت آهسته ویا دویدن/ فعالیت بدنی ☐موارد دیگر

۳. ازعناوین ذیل ، مواردی که در حین پیاده روی تجربه کرده اید را علامت بزنید؟

☐زمین خوردگی ☐سرقت ☐تنه زدن عابرین ☐ اذیت وازار جنسی ☐ هیچکدام ☐دیگر موارد

۴. ازعناوین ذیل ، عواملی که شما را از پیاده روی بازمیدارد را علامت بزنید؟

☐وضعیت آب و هوا ☐راه رفتن با کودکان ☐ روشنایی ناکافی ☐نبودن پیاده رو

☐ایمن نبودن پیاده روها ☐ناتوانی جسمانی ☐ ازدحام جمعیت ☐ناهمواری پیاده در پیاده رو ها روها ☐حمل بار

۵. فاصله منزل شما تا نزدیک ترین وسیله نقلیه عمومی چقدر میباشد؟

☐دقیقه پیاده روی ☐ ۱۵-۲۰ دقیقه پیاده روی ☐۲۰-۳۰دقیقه پیاده روی ☐ بیش از نیم ساعت پیاده روی

لطفا میزان اهمیت موارد زیر را در جدول مشخص نمایید.

	خیلی قابل اهمیت است	به طور متوسط قابل اهمیت است	کمی اهمیت دارد	اصلا اهمیت ندارد
امکانات برای افراد با ناتوانی جسمانی				
موتور سیکلت پارک شده				
احساس باز بودن				
ایمنی و امنیت				
ناهمواری پیادهرو				
شرایط آب و هوایی				
جداسازی پیاده رو از خیابان				
میزان روشنایی پیاده رو ها				
پیاده روی با کالسکه				
وجود رمپ در پیاده رو ها				
حضور دست فروش ها در پیاده رو				

بخش سوم: انتخاب پیاده رو

کارت انتخابی شماره ۱

کدامیک از سناریوهای زیررا برای پیاده روی محل زندگی خود می پسندید؟			
ویژگی ها	انتخاب اول	انتخاب دوم	انتخاب سوم
روشنایی پیاده رو	روشنایی کافی و مناسب	روشنایی کافی و مناسب	
عرض پیاده رو	پیاده رو عریض	پیاده رو باریک	
موانع فلزی (استوانه سنگی) و نصب جدول	بدون موانع فلزی و بلوک	موانع فلزی و بلوک با	هیچ کدام از گزینه ها
یکنواختی و هم تراز بودن پیاده رو	پیاده رومسطح وهموار	شرایط فعلی پیاده رو ناهموار	
هزینه های اضافی شهر (مترمربع)	۳۰۰۰۰۰تومان	۰تومان	
من ترجیح □ انتخاب اول □ انتخاب دوم □ انتخاب سوم میدهم			

کارت انتخابی شماره2

کدامیک از سناریوهای زیررا برای پیاده روی محل زندگی خود می پسندید؟			
ویژگی ها	انتخاب اول	انتخاب دوم	انتخاب سوم
روشنایی پیاده رو	روشنایی کم و ناکافی	روشنایی کم و ناکافی	
عرض پیاده رو	پیاده رو عریض	پیاده رو باریک	
موانع فلزی (استوانه سنگی) و نصب جدول	بدون موانع فلزی و بلوک	بدون موانع فلزی و بلوک	هیچ کدام از گزینه ها
یکنواختی و هم تراز بودن پیاده رو	شرایط فعلی پیاده رو ناهموار	پیاده رومسطح وهموار	
هزینه های اضافی شهر (مترمربع)	۲۰۰۰۰۰ تومان	۰تومان	

من ترجیح □ انتخاب اول □ انتخاب دوم □ انتخاب سوم میدهم

کارت انتخابی شماره 3

کدامیک از سناریوهای زیررا برای پیاده روی محل زندگی خود می پسندید؟			
ویژگی ها	انتخاب اول	انتخاب دوم	انتخاب سوم
روشنایی پیاده رو	روشنایی کافی و مناسب	روشنایی کم و ناکافی	هیچ کدام از گزینه ها
عرض پیاده رو	پیاده رو باریک	پیاده رو باریک	
موانع فلزی (استوانه سنگی) و نصب جدول	بدون موانع فلزی و بلوک	بدون موانع فلزی و بلوک	
یکنواختی و هم تراز بودن پیاده رو	پیاده رومسطح وهموار	شرایط فعلی پیاده رو ناهموار	
هزینه های اضافی شهر (مترمربع)	۲۰۰۰۰۰ تومان	۱۰۰۰۰۰تومان	
من ترجیح □ انتخاب اول □ انتخاب دوم □ انتخاب سوم میدهم			

کارت انتخابی شماره ۴

کدامیک از سناریوهای زیررا برای پیاده روی محل زندگی خود می پسندید؟			
ویژگی ها	انتخاب اول	انتخاب دوم	انتخاب سوم
روشنایی پیاده رو	روشنایی کافی و مناسب	روشنایی کم و ناکافی	هیچ کدام از گزینه ها
عرض پیاده رو	پیاده رو باریک	پیاده رو باریک	
موانع فلزی (استوانه سنگی) و نصب جدول	موانع فلزی و بلوک با	با موانع فلزی و بلوک	

یکنواختی و هم تراز بودن پیاده رو	شرایط فعلی پیاده رو ناهموار	شرایط فعلی پیاده رو ناهموار	
هزینه های اضافی شهر (مترمربع)	۲۰۰۰۰۰ تومان	۲۰۰۰۰۰ تومان	
من ترجیح □ انتخاب اول □ انتخاب دوم □ انتخاب سوم میدهم			

کارت انتخابی شماره ۵

کدامیک از سناریوهای زیررا برای پیاده روی محل زندگی خود می پسندید؟			
ویژگی ها	انتخاب اول	انتخاب دوم	انتخاب سوم
روشنایی پیاده رو	روشنایی کم و ناکافی	روشنایی کم و ناکافی	هیچ کدام از گزینه ها
عرض پیاده رو	پیاده رو باریک	پیاده رو عریض	
موانع فلزی (استوانه سنگی) و نصب جدول	با موانع فلزی و بلوک	با موانع فلزی و بلوک	
یکنواختی و هم تراز بودن پیاده رو	شرایط فعلی پیاده رو ناهموار	پیاده رومسطح وهموار	
هزینه های اضافی شهر (مترمربع)	۳۰۰۰۰۰تومان	۰ تومان	
من ترجیح □ انتخاب اول □ انتخاب دوم □ انتخاب سوم میدهم			

کارت انتخابی شماره ۶

کدامیک از سناریوهای زیررا برای پیاده روی محل زندگی خود می پسندید؟			
ویژگی ها	انتخاب اول	انتخاب دوم	انتخاب سوم

روشنایی پیاده رو	روشنایی کافی و مناسب	روشنایی کافی و مناسب	
عرض پیاده رو	پیاده رو باریک	پیاده رو باریک	
موانع فلزی (استوانه سنگی) و نصب جدول	بدون موانع فلزی و بلوک	بدون موانع فلزی و بلوک	هیچ کدام از گزینه ها
یکنواختی و هم تراز بودن پیاده رو	پیاده رومسطح و هموار	پیاده رومسطح وهموار	
هزینه های اضافی شهر (مترمربع)	۳۰۰۰۰۰تومان	۱۰۰۰۰۰تومان	
من ترجیح □ انتخاب اول □ انتخاب دوم □ انتخاب سوم میدهم			

تاریخ **امضا شرکت کننده**

تاریخ **امضا محقق**

فرم نظرسنجی

بخش سوم: انتخاب پیاده رو

کارت انتخابی شماره ۱

کدامیک از سناریوهای زیررا برای پیاده روی محل زندگی خود می پسندید؟			
ویژگی ها	انتخاب اول	انتخاب دوم	انتخاب سوم
روشنایی پیاده رو	روشنایی کافی و مناسب	روشنایی کم و ناکافی	
عرض پیاده رو	پیاده رو عریض	پیاده رو عریض	
موانع فلزی (استوانه سنگی) و نصب جدول	بدون موانع فلزی و بلوک	بدون موانع فلزی و بلوک	هیچ کدام از گزینه ها
یکنواختی و هم تراز بودن پیاده رو	شرایط فعلی پیاده رو ناهموار	شرایط فعلی پیاده رو ناهموار	
هزینه های اضافی شهر (مترمربع)	۱۰۰۰۰۰تومان	۰تومان	
من ترجیح میدهم	□ انتخاب اول	□ انتخاب دوم	□ انتخاب سوم

کارت انتخابی شماره 2

کدامیک از سناریوهای زیررا برای پیاده روی محل زندگی خود می پسندید؟			
ویژگی ها	انتخاب اول	انتخاب دوم	انتخاب سوم
روشنایی پیاده رو	روشنایی کم و ناکافی	روشنایی کافی و مناسب	
عرض پیاده رو	پیاده رو عریض	پیاده رو عریض	
موانع فلزی (استوانه سنگی) و نصب جدول	بدون موانع فلزی و بلوک	با موانع فلزی و بلوک	هیچ کدام از گزینه ها
یکنواختی و هم تراز بودن پیاده رو	پیاده رومسطح وهموار	شرایط فعلی پیاده رو ناهموار	

هزینه های اضافی شهر (مترمربع)	۲۰۰۰۰۰ تومان	۰ تومان	
من ترجیح □ انتخاب اول میدهم	□ انتخاب دوم	□ انتخاب سوم	

کارت انتخابی شماره 3

کدامیک از سناریوهای زیررا برای پیاده روی محل زندگی خود می پسندید؟			
ویژگی ها	انتخاب اول	انتخاب دوم	انتخاب سوم
روشنایی پیاده رو	روشنایی کم و ناکافی	روشنایی کم و ناکافی	هیچ کدام از گزینه ها
عرض پیاده رو	پیاده رو عریض	پیاده رو باریک	
موانع فلزی (استوانه سنگی) و نصب جدول	بدون موانع فلزی و بلوک	بدون موانع فلزی و بلوک	
یکنواختی و هم تراز بودن پیاده رو	پیاده رومسطح وهموار	پیاده رومسطح وهموار	
هزینه های اضافی شهر (مترمربع)	۳۰۰۰۰۰تومان	۳۰۰۰۰۰تومان	
من ترجیح □ انتخاب اول میدهم	□ انتخاب دوم	□ انتخاب سوم	

کارت انتخابی شماره 4

کدامیک از سناریوهای زیررا برای پیاده روی محل زندگی خود می پسندید؟			
ویژگی ها	انتخاب اول	انتخاب دوم	انتخاب سوم
روشنایی پیاده رو	روشنایی کم و ناکافی	روشنایی کم و ناکافی	هیچ کدام از گزینه ها
عرض پیاده رو	پیاده رو عریض	پیاده رو باریک	
موانع فلزی (استوانه سنگی) و نصب جدول	با موانع فلزی و بلوک	با موانع فلزی و بلوک	

یکنواختی و هم تراز بودن پیاده رو	شرایط فعلی پیاده رو ناهموار	پیاده رومسطح و هموار	
هزینه های اضافی شهر (مترمربع)	۱۰۰۰۰۰تومان	۰تومان	
من ترجیح میدهم □ انتخاب اول	□ انتخاب دوم	□ انتخاب سوم	

کارت انتخابی شماره 5

کدامیک از سناریوهای زیررا برای پیاده روی محل زندگی خود می پسندید؟			
ویژگی ها	انتخاب اول	انتخاب دوم	انتخاب سوم
روشنایی پیاده رو	روشنایی کم و ناکافی	روشنایی کافی و مناسب	هیچ کدام از گزینه ها
عرض پیاده رو	پیاده رو عریض	پیاده رو باریک	
موانع فلزی (استوانه سنگی) و نصب جدول	بدون موانع فلزی و بلوک	با موانع فلزی و بلوک	
یکنواختی و هم تراز بودن پیاده رو	شرایط فعلی پیاده رو ناهموار	پیاده شرایط فعلی پیاده رو ناهموار	
هزینه های اضافی شهر (مترمربع)	۳۰۰۰۰۰تومان	۳۰۰۰۰۰تومان	
من ترجیح میدهم □ انتخاب اول	□ انتخاب دوم	□ انتخاب سوم	

کارت انتخابی شماره 6

کدامیک از سناریوهای زیررا برای پیاده روی محل زندگی خود می پسندید؟			
ویژگی ها	انتخاب اول	انتخاب دوم	انتخاب سوم
روشنایی پیاده رو	روشنایی کم و ناکافی	روشنایی کافی و مناسب	هیچ کدام از گزینه ها

عرض پیاده رو	پیاده رو باریک	پیاده رو باریک	
موانع فلزی (استوانه سنگی) و نصب جدول	با موانع فلزی و بلوک	بدون موانع فلزی و بلوک	
یکنواختی و هم تراز بودن پیاده رو	پیاده رومسطح وهموار	پیاده رومسطح وهموار	
هزینه های اضافی شهر (مترمربع)	۱۰۰۰۰۰تومان	۰تومان	
من ترجیح □ انتخاب اول میدهم	□ انتخاب دوم	□ انتخاب سوم	