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Examining Older Adults' Attitudes towards Different Mobility Modes in Iran

Abstract

Introduction

Mobility is one of the main factors affecting healthy aging. Older people have distinct mobility patterns, and age-related problems might make it difficult to move independently, which can have various health consequences. However, there is a scarcity of studies on older people's mobility views in the Global South, particularly Iran. This paper examines older adults' attitudes towards different mobility modes in Shiraz, Iran, to fill this gap.

Methods

Data were collected via semi-structured interviews with 66 older adults, and thematic analysis was used to identify their mobility attitudes and barriers.

Results

As a result, five main themes were extracted, including environmental, socio-cultural, operational, economic, and health factors. In general, the respondents stressed the physical and mental health benefits of walking and cycling, although they thought Shiraz lacked enough walking and cycling infrastructure. Furthermore, many older adults were so reliant on their cars that they thought it would be difficult to survive without one. The inefficiency of public transit adds to a reliance on private vehicles.

Conclusion

Examining the opinions of older adults provided valuable insights into the challenges they face when using different mobility modes. As there is a growing trend of car use among older adults in Shiraz, the city needs strategies to encourage older people to use more active and environmentally friendly modes of mobility, which can help improve the health of older adults.

Keywords: Older adults, Healthy aging, Mobility, Attitude, Thematic analysis.

1. Introduction

The population is rapidly aging in the world. It is predicted that from 2015 to 2030, people over 60 will increase from 901 million to 1.4 billion (United Nations, 2015). This trend can be seen in developed countries and developing ones. By 2050, 8 out of 10 older people will live in developing countries (United Nations, 2019). Iran is one of the Middle East countries with a rapidly aging population; the World Health Organization estimates that the country's older adult population will increase from 6.5 percent to 17.5 percent by 2030. Iran's elderly population has increased from less than 1.2 million in 1956 to more than 6.4 million in 2016 (Statistical Center of Iran, 2016).

Meanwhile, a public health challenge is developing effective measures to improve health in an aging society. Healthy aging, which refers to this public health goal, means developing older adults' physical, social, and mental function and well-being. Meanwhile, mobility, defined as the ability to move reliably and safely to any destination, at any time, and using any mode, is critical to increasing quality of life and healthy aging (Musselwhite and Haddad, 2010; Satariano et al., 2012).

Indeed, independent living, active and healthy living, and involvement in recreational, social, and cultural activities are all dependent on out-of-home mobility for older persons (Luiu et al., 2018). Moreover, older people are a diverse population with varying mobility requirements, some of whom may have mobility limitations. According to several researchers (Haustein, 2012; Haustein et al., 2013; Haustein and Siren, 2015), older adults may be divided into four categories based on their mobility characteristics: 1) Affluent mobile drivers who often use cars and have high levels of mobility engagement; 2) Car-dependent older adults who often use cars but have low levels of mobility engagement; 3) Mobile multimodal older adults who use all modes of mobility and have high/moderate levels of mobility engagement, and 4) Transportation service-dependent older adults who walk and use public transportation and are car passengers with low levels of mobility engagement.

In many countries, such as Canada (Hansen et al., 2020) and Iran, the car is a popular mobility mode for older adults. Motor vehicle traffic may result in early mortality due to inactivity, car crashes, increased environmental pollution such as noise and air pollution, higher temperature, and decreased green space. For instance, data indicate that each year, air pollution and reduced physical activity induced by motor traffic result in 7 million and

2.1 million deaths globally (Khreis et al., 2016). Regarding the growing popularity of the car and the problems it causes, policymakers need to identify the factors influencing mobility choices to create a sustainable balance among the different mobility modes used by older adults (Mifsud et al., 2017).

There is little information about older adults' attitudes towards different mobility modes in Middle Eastern countries, and most studies are conducted in western countries. At the same time, some differences between eastern and western countries might affect older people's attitudes (Schwanen and Páez, 2010). Schwanen and Páez (2010) state that we cannot assume that research findings on Global North countries can be generalized to the Global South. Thus, differences in perceptions of older people in different cultural and geographical contexts require more detailed research. Gorman et al. (2019) point out that context is essential and is not limited to geography; mobility concerns the individual and individual interaction and integration with family, household, community, and society. Research shows that older people in different socio-cultural settings have different mobility patterns (Feng, 2017). For example, older adults in some Asian nations experience limits on active mobility (Soltani et al., 2018), and women may be unable to travel freely (Ahmad et al., 2019); these constraints may have a detrimental effect on older adults' physical and mental health.

In Iran, considering the increasing rate of population aging, one of the main concerns is healthy aging. The rate of active mobility modes, such as walking and cycling, is very low among older Iranians, and in many cities like Shiraz, there is a growing tendency for car use, which can have serious health consequences for older people. On the other hand, road traffic injuries rank as Iran's third greatest cause of mortality. Older people are more frail than younger ones because of age-related health problems, which is a major reason for the increased fatalities of older people (Li et al., 2003). Bhalla et al. (2009) state that while young individuals are more likely to be involved in non-fatal collisions, older adults have the greatest death rate, mainly owing to pedestrian crashes. This issue has become a serious threat to the health of older adults. This paper presents data from a qualitative study involving older adults living in different parts of Shiraz, Iran. The research questions addressed in this study are: What are older adults' attitudes towards different mobility modes? What are the main barriers to older adults' active mobility in the city? We conducted semi-structured interviews in the city to answer these questions.

2. Background

An important factor affecting people's mobility is their attitudes toward different mobility modes (Bamberg et al., 2007; Heath and Gifford, 2002). Attitude may be defined as a psychological tendency exhibited by a degree of dislike or liking towards a given thing (Hoffmann et al., 2020). Indeed, attitudes (such as evaluating public and private transportation) and intentions are among the perceptual and social determinants of using a mobility mode (Şimşekoğlu et al., 2015). This section reviews some studies on older people's attitudes about different mobility modes.

The car is a dominant mobility mode in many areas, but it is more than just a mode of mobility (Steg, 2005). Personal vehicle plays a central role in shaping people's lives, choosing their living location, developing their social networks, accessibility to various services, and connecting with other communities (Gardezi et al., 2006). According to Lord et al. (2011), some older people are very dependent on their cars because they feel the car provides several advantages such as comfort, freedom, time savings, and a sense of independence, prestige, and superiority. Some individuals drive their cars not merely to go somewhere but also to enjoy the experience. This could be one of the reasons why actions done to limit car use have not been successful so far (Steg, 2005). Travel purpose and living location may influence older adults' car use; Du et al. (2020) state that older people living in the suburbs prefer to use cars to travel to health centers.

Despite the benefits of using a private car for older adults, the increasing number of older drivers may lead to road crashes that impose a high cost on the health system. Many older drivers have problems driving because of functional disorders, reduced driving skills, slower reaction times, and poor judgment (Nakanishi and Black, 2015). It's worth noting that age is not, in and of itself, the cause of crashes, but medical conditions that impact critical driving skills do play a role (Eby et al., 2019, p. 139). Studies indicate that factors such as dislike or insecurity (Kowalski et al., 2012; Meng and Siren, 2015), discomfort (Hassan et al., 2015), fear of driving (Pellichero et al., 2021), fear of falling (MacLeod et al., 2014; Marie Dit Asse et al., 2014), careless driving of other drivers and showing disrespect to older drivers (Ahmad et al., 2019; Ipingbemi, 2010) can impose restrictions on older drivers.

Many researchers have examined the desirable aspects of public transportation from the viewpoint of older adults. Inefficient public transportation may negatively influence older adults' physical and mental health. Yuan et al. (2019) report that since older people have

fewer time constraints, schedule and reliability are less important, but safety, driver behavior, and convenience matter to them. Shrestha et al. (2017) state that safety is essential for older people because they are more likely to be injured in crashes, and it takes them longer to recover than young people. In many cases, older people are reluctant to use public transportation because they are afraid of falling over or being exposed to crimes. Rahman et al. (2020) discuss that even if public transit is physically accessible, older passengers have problems with safety, security, reliability, flexibility, and comfort; they often do not easily understand the exact routes and time. If public transit is inconvenient, older adults who are unable to drive prefer to hail a ride from another driver rather than using alternative modes of transportation (Rahman et al., 2020). Another critical factor influencing older people's attitudes is drivers' and passengers' behavior. Ahmad et al. (2019) discuss that it is crucial for older people that drivers and passengers treat them with respect. Drivers should pull over at designated stops and provide extra time for older passengers to get on and off the bus. Many older people report negative emotions about fatigue, traffic, and suffering from using public transportation (Ahmad et al., 2019). As Beirão and Sarsfield Cabral (2007) note, factors related to vehicle conditions such as cleanliness are crucial for users. Ipingbemi (2010) states that if the steps of the bus are too high, the older people cannot get on or off on time. Therefore, they may fall to the ground and suffer physical injuries.

Walking may help the economy, the environment, and public health (Ranjbar and Motalaei, 2017). Physical activity is pleasant and encouraging to older people, according to Jancey et al. (2008), and it assists in forming social networks. Older adults like walking because they can adjust their pace more easily and have more time to analyze their surroundings (Anderson et al., 2010). Evidence suggests that walking can help maintain physical and mental independence in older people by preventing health problems such as type 2 diabetes, stroke, cancer, weight gain, and cardiovascular diseases (King and King, 2010; Notthoff and Carstensen, 2014). Van Cauwenberg et al. (2014) suggest that walking has a positive relationship with interpersonal relationships, local ties, and formal community participation, including contacts and social support for older adults, which can significantly impact the mental health of older adults. Despite the benefits of walking, Krogstad et al. (2015) discuss that poor health and poor access to the environment are limiting factors for walking in older adults.

Based on the evidence on the effects of cycling on reducing the risk of mortality and chronic diseases in younger people and the positive effects on social and mental health and physical functioning of older adults, it can be stated that cycling can play a role in healthy aging (Van Cauwenberg et al., 2018). Zander et al. (2013) state that one of the main reasons for cycling among older people is doing exercise because many do not like the fitness club and believe that cycling is much more fun. Haustein (2012) identified cycling enthusiasm and autonomy as constructs of attitude towards cycling among older people. However, Rijkswaterstaat (2016) reports that mental disorders such as decreased working memory, decreased concentration, and increased reaction time can make cycling in traffic mentally challenging. Besides, physical problems, such as increased stiffness and reduced strength, can lead to severe injuries in older people after falling from a bicycle and endanger their health (Engbers et al., 2018). Engbers et al. (2018) report that cyclists who are not completely confident when cycling are 1.8 times more likely to fall. Cyclists are more vulnerable at intersections, on curves, and in designated cycling infrastructure (Engbers et al., 2018). Zander et al. (2013) discuss that the main barrier to cycling for older people is fear of cars. Thus, many older adults prefer cycling only on special routes and quiet streets (Zander et al., 2013).

However, in the context of this study, Iran, healthy aging faces many challenges. The study on Tehran shows that older adults, particularly older women, live relatively inactive lives, according to the active aging index (Tajvar et al., 2019). According to another research on Shiraz, paying attention to social support and raising awareness may successfully increase active aging in older persons who are somewhat active (Movahed and Majidi, 2019). This low level of activity and mobility can adversely affect older adults' health in Iran.

Despite the tremendous impact of efficient mobility on healthy aging, it has not attracted much attention in research in Iran. A few studies have examined older adults' mobility using quantitative methods. According to Mamdoohi and Naqavi (2017), older adults in Mashhad prefer public transportation. Furthermore, older women tend to be car passengers, and older men walk more than older women. Soltani et al. (2018) emphasize that the main factors affecting car use among older adults in Shiraz include employment status, household size, car ownership rate, the purpose of travel, property prices, and mixed-use. Hatamzadeh and Hoseinzadeh (2020) show that factors such as having a car, the presence of small children in the family, traveling between 8 and 10 am, and a higher

proportion of the main roads have a significant impact on the likelihood of walking among older men in Rasht, while factors such as mixed-use and travel distance have an essential impact on both men and women.

3. Methods

3.1. Case study

3.1.1. Shiraz

Shiraz is the fifth-largest city in Iran and the most populous city in the country's south. The city had a population of 1,565,572 in 2016, or 1,869,000, including the suburbs. Shiraz is located in the mountainous region of Zagros and has a temperate climate. Shiraz Municipality is divided into 11 independent urban regions covering a total area of 240 square kilometers. Due to its closeness to the towns of southern Iran and the surrounding villages, the majority of which lack effective urban services, Shiraz has become a service hub, resulting in a huge influx to the city. In addition, the city's diverse tourist and historical areas attract millions of visitors annually, resulting in traffic congestion and a shortage of urban infrastructure like parking places. Figure 1 shows the location and some pictures of Shiraz.

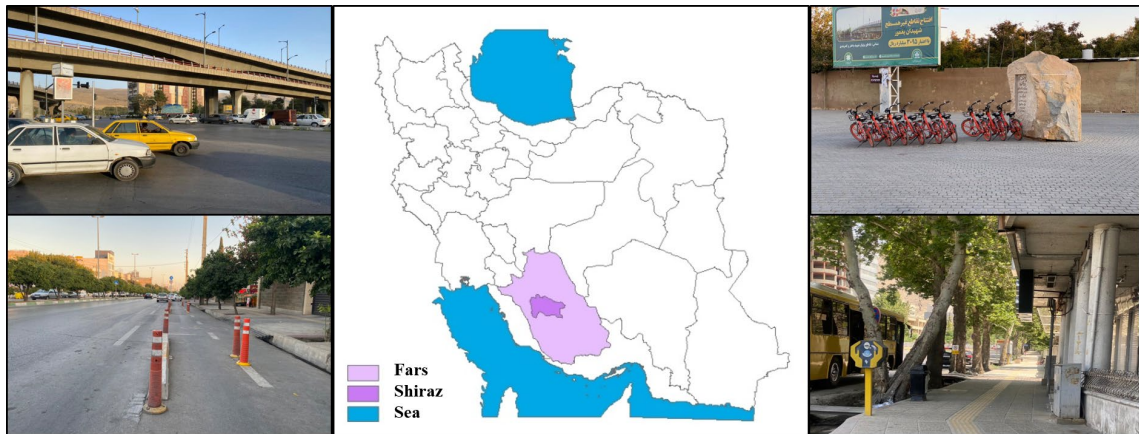


Figure 1: The location and pictures of Shiraz

3.1.2. Transportation system

According to the Shiraz Household Travel Survey (2016), the city has 74 bus routes and 1053 buses of six types. 35% of the buses are over ten years old. Seventy-four bus lines run throughout the day, with four routes operating at night. Since 2009, buses have been gradually outfitted with card readers, allowing passengers to pay using citizen cards rather than cash. Various taxi kinds are available in Shiraz, including circulating, shuttle,

airport, terminal, wireless, telephone, internet, and unauthorized taxis. Circulating taxis operate on a variable path across the city, determining their itinerary depending on the needs of the passengers. Shuttle taxis take passengers back and forth between two specific locations at a fixed fare. Airport taxis move passengers from the airport to the city. Terminal taxis carry passengers from bus terminals to different parts of the city. Wireless taxis are equipped with taximeters divided into three categories: Taba, 133, and Rasaneh. People may use telephone taxis to go about simply dialing a number. People are served via online taxis through smartphone apps. Contrary to the mentioned licensed taxis, which are yellow or green and have distinctive signage, unauthorized cabs lack such markings. These taxis are the private automobiles of some persons who transport customers for a charge equivalent to or more than that of licensed taxis. For some of these drivers, driving is their primary occupation, while for others, it is a secondary one. Since these taxis are not governed by the taxi organization, they are not compelled to comply with the relevant legislation. The metro of Shiraz comprises six lines. However, only the first line is active, the second line is under construction, and other lines are under implementation planning. The first line starts from Allah Square in the southeast and ends in Ehsan Square in the west. The second line runs from south to north, connecting Mianroud to Golestan Square.

Based on the Shiraz Household Travel Survey, the modal share in the city includes 12% public transportation, 28% taxis, 50% private cars, and 10% other modes. A significant proportion of journeys and intra-city traffic in Shiraz are made by automobile, which may be the result of a lack of other transportation choices on the one hand and a disregard for the implications of individual and communal actions on the other. The city has a total population of 1.7 million, with 10% over age 60 (Statistical Center of Iran, 2016). Adults over 60 mostly use private cars, public transportation, and taxis.

3.2. Research Design and Data Collection

We analyzed data using a qualitative method. Qualitative research takes a naturalistic and interpretative approach to the topic, studying occurrences in their natural settings and interpreting them in terms of what they mean to individuals (Aspers and Corte, 2019). The advantage of qualitative methods is that they allow people to express what matters to them in their own words (Beirão and Sarsfield Cabral, 2007).

In the field of transportation, the qualitative method has recently become more popular (Cochran, 2020; Galway et al., 2021; Khaleghi et al., 2021; Yang et al., 2021; Zarabi et al., 2019). Previously, preselected variables were applied to study transportation issues such as mode choice. Although predetermined factors assisted in selecting one alternative over another, they only stated a limited number of features. The qualitative technique, in contrast, enables users to describe their travel factors (Rojas López and Wong, 2017). Thus, qualitative research can help us better understand the attitudes and perceptions of people (Marquart et al., 2020).

Participants were recruited in various urban spaces, including walkways, parks, and streets, via purposeful sampling. Adults over the age of 60 who resided in Shiraz and were free of disorders such as Alzheimer's that might interfere with their ability to answer the questions were eligible to participate in the research. The data were gathered using semi-structured interviews, which gave insight into the opinions of older people about various modes of mobility.

3.3. Data analysis

The thematic analysis proposed by Braun and Clarke (2006) was used to analyze the data. Thematic analysis is a qualitative method used to analyze categories and present data-related themes. This technique provides a detailed description of the data and tackles several topics via interpretations. This methodology is ideal for any study that systematically compares several interpretations (Ibrahim, 2012).

The interviews were conducted in Persian. In the first step, the lead author read all transcripts to get acquainted with the content. At this point, initial ideas were noted to support coding. In the second step, the transcripts were coded in a systematic way. This step was very helpful in organizing the responses. In the third step, the repeating patterns in the data were identified and summarized in terms of broader themes. Thematic maps were created and discussed with other authors to confirm the clarity of the themes. Therefore, other authors helped to validate the extracted themes. Mind maps were used to identify the connections and hierarchies between the initial codes. In the fourth step, themes were reviewed several times by all the authors to ensure that they were compatible with the initial codes. The Atlas ti software was used for systematic coding and collation of themes.

4. Results

4.1. Interview guide

Sixty-six interviews were conducted by one of the researchers in different parts of Shiraz from January 18 to March 20, 2021, and all interviews were recorded. Each interview lasted about 30 to 45 minutes and was conducted using an interview guide, allowing for open-ended discussion. After interviewing these 66 older adults, we determined that interviewing more individuals would not provide additional information pertinent to our study. As a result, we came to the conclusion that theoretical saturation had occurred after these interviews. Individual factors such as age, occupation, driver's license possession, and car ownership were questioned in the first part, while the major mobility modes of older persons and their views toward various modes were inquired about in the second part.

The respondents differed in age and gender; Table 1 shows the respondents' characteristics. 50 percent were 60-69 years old, 60 percent had a car, and 67 percent had a driving license. Furthermore, 73 percent of the respondents were retired/housewives.

Table 1: Respondents' characteristics

Respondents Characteristics	Groups	Men	Women	Total	Percent
Age	60-69	18	15	33	50
	70-79	13	6	19	29
	80+	8	6	14	21
Car ownership	Yes	29	11	40	60
	No	10	16	26	40
Driver's license possession	Yes	33	11	44	67
	No	6	16	22	33
Occupation	Part-Time	15	3	18	27
	Housewife	0	17	17	26
	Retired	24	7	31	47

4.2. Results of the interviews

We asked older people to comment on different mobility modes, including modes they did not use. This helped us to understand their opinions about the advantages and disadvantages of different modes. Furthermore, questioning older individuals about the modes they seldom used, such as cycling, which is utilized by a tiny number of older people, was beneficial since it helped us to understand why they did not use it.

Table 2 shows the extracted themes and subthemes and the frequency of each subtheme based on the interviews. The subthemes are divided into five themes: Environmental, socio-cultural, operational, economic, and health factors. The frequency of each theme for each mobility mode is shown by numbers and data bars. Environmental factors refer to the natural and built environment; socio-cultural factors refer to others' behavior toward older adults; operational factors are related to the operation of each mode. Economic factors refer to the cost of using each mode, and health factors are related to physical and mental health. The respondents frequently referred to health-related factors such as physical activity, mental well-being, healthy body weight, strengthened bones, decreased (increased) stress levels, shortness of breath, and feeling (un) safe.

In the following section, the opinions of the older adults about different mobility modes are presented separately for each mode. Subthemes extracted from the older people's views are shown in bold. The gender, age, and occupation are presented in parentheses after the quotations.

4.1. Attitudes towards walking

The interviewees emphasized the positive effects of walking on their physical and mental health. Many (50%) considered walking a **physical activity** that could improve their health. Participants shared comments such as, "I was overweight, and daily walking helped me reach a normal weight." (Woman, 64, Housewife).

However, many respondents saw walking as a kind of exercise rather than a means of transportation for meeting everyday necessities. The enormity and dispersal of the metropolis necessitate vehicle travel across considerable distances. Participants shared comments such as, "I believe walking is a type of exercise; however it is inconvenient to reach many services." (Man, 74, retired).

Nevertheless, some (40%) believed that walking was a **multipurpose** mode that improved their health and helped them do their daily tasks. For example, "Walking kills two birds with one stone; you exercise and get daily tasks done simultaneously." (Man, 68, Retired). Older adults (40%) emphasized the positive impact of walking on mental **well-being** and **stress reduction**. For example, "The only way I can reduce my stress is to walk in our neighborhood park." (Woman, 80, Retired).

Many respondents (60%) stated that walking could **endanger their health** because of the risk of crashes with cars and motorcycles. For example, "Walking is important for fitness, but motorcycles do not let us walk on the sidewalks." (Woman, 65, Retired). They preferred not to walk at night because of the darkness of the sidewalks, making crashes or crimes more likely. Participants shared comments such as, "Walking is great during the day, but it is dangerous at night because my eyesight is weak and I may have a crash." (Woman, 71, Housewife). Most respondents preferred to walk with their friends or family and not alone. Besides, some had minimized their walking because they had a car crash in the past. For example, "I used to walk every day before that crash. Unfortunately, younger drivers do not let us cross the street." (Man, 80, Retired). Some respondents emphasized the necessity of **good health** for walking. For example, "I like walking, but my leg pain makes walking impossible." (Woman, 63, Housewife) and "Walking is good, but I cannot walk much because I am overweight and my knee hurts." (Woman, 73, Retired). Most older adults (80%) pointed out that walking requires **proper infrastructure**, such as safe sidewalks with adequate light, which is not available in many parts of the city. They mentioned the sidewalks' inappropriate pavement and lighting. For example, "Some sidewalks are so bumpy that I feel like falling to the ground at any moment." (Woman, 60, Housewife).

4.2. Attitudes toward cycling

Some older people regarded cycling as an attractive and energetic **exercise** that enhanced their health. For example, "Cycling makes me happy and strong ... When I ride my bike, I feel like I am still young." (Man, 68, Retired). Some (30%) emphasized the significant effect of cycling on **reducing stress** and **increasing relaxation**. "Cycling helps you regulate your breathing and thus relieve stress." (Man, 65, Retired). Some (20%) emphasized the effect of cycling on **strengthening bones**. "Cycling makes me feel strong and energized in the bones of my body." (Man, 65, Part-time).

However, most interviewees (90%) believed that cycling was **not an inclusive mode** and that older adults, specifically women, might have problems. Many respondents believed that cycling was suitable for young people who were more physically fit. For example, "Cycling is suitable for younger people; of course, Shiraz is so crowded that I think there is no space for cyclists." (Woman, 60, Housewife), and "Cycling is a good exercise for

children and young people because it requires much energy. I take my grandchildren to the park next door every day for a bike ride." (Man, 80, Retired). Women had difficulty cycling in cities since they were previously prohibited from doing so owing to religious beliefs: "It would be wonderful if there were appropriate cycling routes for women." (Woman, 62, Retired). Some (40%) considered cycling an **environmentally friendly** mode that may minimize air pollution in a densely populated city like Shiraz and improve people's health. The majority of respondents, however, believed that cycling was only appropriate in parks and walkways, "I sometimes ride my bike in the park adjacent to our home, but I do not feel secure on the streets." (Man, 61, Retired). Many respondents believed that cycling required certain conditions, such as good **health, adequate infrastructure, and good weather conditions**. Some pointed out that one must be in good health to cycle. Physical problems, such as back pain, foot pain, and heart disease, can make cycling difficult for older adults. For example, "Besides having a good bike, you should be physically healthy. I have had foot surgery and heart disease, so I cannot ride a bike." (Man, 71, Retired). Many respondents (80%) believed cycling requires proper bike lanes and safe intersections. There are not many bike lanes in Shiraz, and cyclists have to cycle between cars or on the sidewalks. For example, "Cycling is fun if there is a bike lane and you do not have to find your way between the cars." (Man, 65, Part-time). Many respondents mentioned that they preferred not to cycle because they were afraid of falling to the ground and being laughed at by others. Furthermore, some (25%) believed that cycling required certain weather conditions, and in Shiraz, cycling is not practicable during winter and summer.

4.3. Attitudes towards car

Almost all respondents (90%) said that driving is the most convenient means of transportation to get to numerous places and meet everyday demands. When it came to getting to health facilities, several people said that car was the best choice. For example, "Sometimes it is vital to use a car, like when I want to go to the doctor." (Man, 65, Retired). Most of the experienced doctors' offices are concentrated on Zand Boulevard, in the central part of the city; therefore, the older adults have to travel long distances to reach efficient medical centers.

Many respondents (80%) emphasized the **flexibility** and **freedom** of using their cars to stop where they wanted or move in any direction. The metro system does not cover all parts of the city, and the bus system does not have stops at some destinations; Moreover, the buses are not of good quality, so older adults prefer to use cars. For example, "My car is the best option. I can go wherever I want, whenever I want." (Man, 63, Retired). Many respondents were so **dependent** on their cars that they used them even for short distances; they could not live without their cars. Respondents shared statements such as, "I always use my car; my life would be meaningless without it." (Man, 65, Retired) or "Car is the king of all mobility modes; I cannot live without my car." (Man, 60, Part-time).

Some (20%) had an unfavorable attitude toward cars and claimed that cars were the city's primary source of traffic, air, and noise pollution. They emphasized that car noise and pollution might have a harmful impact on people's health. For example, "Shiraz has turned into a big parking lot. Every family has several cars. Car means smoke, pollution, suffocation. " (Woman, 69, Housewife). Some believed that car use depended on some external factors, such as parking (60%) and the behavior of other drivers (40%). They thought the car was a suitable means of mobility if there were enough parking spaces. In Shiraz, especially in the city center, there is a shortage of parking, and people have to spend hours looking for a parking space. For example, "The car is good for long distances, but if there is a parking space and you do not have to spend 10 hours looking for a space if you want to do a half-hour task." (Woman, 65, Retired).

In addition, younger drivers are not always accommodating when it comes to allowing older drivers sufficient time to park or make a turn. In certain instances, older adults would rather not drive due to the stress caused by other drivers' excessive speed. Respondents shared comments such as, "I believe the car should only be utilized in an emergency since city drivers drive so poorly and I am worried." (Man, 65, retired) or "When some drivers realize the motorist in front of them is old, they honk frequently." (Male, 67, Retired)

4.4. Attitudes towards the bus

Many respondents (80%) believed that the bus system was **inefficient** and had **unknown departure times**. They were **not comfortable** using the bus due to the lack of proper heating or cooling systems, which could adversely affect their health. Therefore, they preferred to use the bus only for short distances. They shared statements such as, "Public

transportation is not age-friendly at all, and I would rather borrow money and take a taxi than take the bus." (Man, 63, Retired) or "Sometimes I take the bus for short distances, but I cannot tolerate it for more than half an hour. I feel suffocated." (Woman, 65, Housewife).

In addition, some **drivers** are not patient and do not give older passengers enough time to get on and off, increasing the stress on older adults and making them fall to the ground or not get onto the bus. In addition, younger people sometimes do not offer older adults seats, which upsets them. For example, "The bus is good if there is an empty seat. Sometimes when I get on the bus, and there is no empty seat, and some young people pretend not to see me, I get annoyed." (Woman, 68, Housewife). Some complained about the high steps of the buses, which could cause them to fall to the ground and endanger their health. "I have fallen to the ground several times and injured my knee because of the high steps." (Woman, 65, Housewife).

Some respondents (20%) believed that the bus was more **affordable** than other modes of mobility. For example, "The good thing about the bus is that it is quite affordable. You can travel from one part of the city to another at a low cost." (Man, 68, Retired).

4.5. Attitudes towards the metro

Many respondents (60%) saw the metro as a convenient means to go to congested city areas, such as the city center. Some people said that the metro is secure since it is segregated from other cars on its path. "I believe the metro is quite safe since it has no contact with other cars," for example. (Man, 63, Retired). Some respondents (30%) mentioned that the metro was **cleaner** than the bus and did not have any unpleasant smells. They pointed out that the bus seats were old while the seats in the metro were new. For example, "The metro is much cleaner than the bus, so I use it regularly." (Man, 66, Retired). Some pointed out the **difficult access** to the metro (20%) and **shortness of breath** (20%) because they had to walk down many stairs. For example, "I do not like to use the metro because I have to go several feet underground." (Woman, 65, Housewife).

4.6. Attitudes towards taxis

Circulating taxis are a fantastic means of transportation; however, there is a lengthy wait to use one. Especially in densely populated places such as the city center, taxis fill up rapidly, and passengers must wait long for the next one. Some (30%) highlighted the high

prices, particularly for long routes, and emphasized that taxis are ideal for short excursions. They made statements like "Taxis are costly over large distances." (Male, 63, Retired). According to some, only licensed cabs were safe, while unauthorized ones were not. Therefore, they preferred using licensed cabs whenever feasible.

Some respondents (20%) emphasized **the accuracy of online taxis** as the exact origin and destination can be determined on the map. In addition, since these taxi drivers always take the quickest route, people arrive at their destination quickly. For example, "Online taxi is a good mode because the application recognizes the exact location." (Woman, 65, Retired). Some respondents did not have a smartphone and could not install the **online taxi applications**. Some (60%) mentioned that using the applications was challenging, and they preferred to ask their children to arrange for them to take an online taxi if needed. For example, "Online taxi is a good mode, but I am not very good at using apps." (Man, 75, Retired). Some believed that if the internet went down somewhere, the passenger would not be able to track the route; hence, they thought that online taxi is not a completely **safe mode** as it depends on the status of the internet. Some older people were stressed about using online taxis because they did not master the use of applications, believing that the driver might harm them. "I do not use online taxis at all because I have heard that they are not safe and the driver may take me to the suburbs and steal everything I have." (Woman, 70, Housewife).

Some stated that online taxis could be a good option in **emergencies** when other modes are unavailable or get to places where parking is impossible. For instance, "I only utilize online cab services when traveling alone to the terminal or airport, or when there is no parking available." (Male, 61, Part-time). Some respondents compared the pricing of online taxis to that of phone taxis and concluded that online taxis are much more **affordable**, particularly for long journeys.

Some respondents (30%) stated that it was much **easier to access** a phone taxi than an online taxi because a phone taxi would come home quickly with one call, and they did not have to use complicated applications. For example, "I use the phone taxi because it comes quickly with a call." (Woman, 63, Retired). Some respondents (20%) criticized the phone taxi's **expensive fee** compared to other means of transportation, particularly for long distances. For example, "The phone taxi is good only for emergencies because the fare is high." (Woman, 65, Housewife).

Table 2: Extracted themes and subthemes

Themes	Subthemes	Mobility Mode							
		Walking	Cycling	Car	Bus	Metro	Taxi		
							Circulating	Online	Phone
Environmental	Infrastructure dependent	55	51	38					
	Environmentally (un)friendly		28	15					
	Weather dependent		17						
Socio-cultural	Drivers' behavior			26	29		9		
	Passengers' behavior				23				
Operational	Feeling (not)comfortable			62	56				
	(Not) inclusive	25	59						
	Dependency			39					
	Fast					40			18
	(Not) clean				35	19			
	Easy (difficult) access			58		11		37	21
	Long(short) waiting time				31		18		
	Accurate							13	
Economic	Flexible	26		54					
	High fare						23		14
	Low fare				12			5	
Health	Physical activity	36	14						
	Mental wellbeing	31							
	Healthy body weight	17							
	Strengthened bones		11						
	Increased (decreased) stress levels	23	19	31					
	Shortness of breath				47	15			
	Feeling (un)safe	37	43		21	29		18	15

5. Discussion

This study is one of the first attempts to explore older adults' attitudes towards different mobility modes in Iran. Considering traditional and religious beliefs in Iran, many older adults lived with or near their children in the past. However, owing to industrialization and diminishing family structures, the once-dominant value system in the nation has waned in many cities, including Shiraz, in recent decades. As a result, household structure in Iran has changed from extended to nuclear families. Thus, many older people live alone and have to travel to meet their needs (Soltani et al., 2018).

Older adults emphasized the health benefits of walking, such as improving well-being, balancing weight, increasing physical activity, and reducing stress levels. These findings are consistent with (Notthoff and Carstensen, 2017), who state that walking can help prevent health problems in older adults, and Krogstad et al. (2015), who report that poor access and poor health can hinder walking in older people in Kristiansand, Norway.

Older adults described the sidewalks in Shiraz as unsafe spaces where they expected to be hit by motorcycles at any moment. Feeling insecure while walking has a bad effect on the mental health of older adults. However, older women were more interested in walking than older men. Moreover, the older age group (80 - 90 years old) walked less due to their various physical problems.

In recent years, several walkways have been built in Shiraz, such as the walkways near Karim Khan Citadel, Shahcheragh Shrine, and Hafez Tomb. Some walkways have problems, such as separation from tourist attractions and lack of visual appeal, making them less attractive to the public. In recent years, health walkways have been built in four parts of the city to encourage people to walk and cycle. In recent years, notably during the pandemic, we have seen an upsurge in the number of older people walking in Shiraz's different areas. Due to quarantine conditions and travel limitations, many older adults stroll in local parks near their houses rather than go to other city areas.

Older people mentioned the health benefits of cycling, such as physical activity, strengthening bones, and reducing stress. The interesting thing about cycling was that many respondents believed that despite the many health benefits of cycling, this mobility mode was more suitable for children and young people. However, older men liked cycling more than older women did. Since most of the older adults did not cycle, they did not have a clear picture in their minds. This can be seen in the city; the number of older adults cycling is much lower than young people. One of the reasons for this is the inadequate cycling infrastructure in the city.

The rate of cycling in Iran is generally low, and currently, only about 0.8% of the daily trips in Tehran (the capital of Iran) are done by bicycles. Therefore, the belief in cycling and its inconvenience is relevant to the general population. In some cities, such as Shiraz, people can rent bikes called Bidood (which means smoke-free) using a smartphone application. In 2017, Bidood Company, as the first operator of smart shared bicycles, increased its activity in clean transportation to reduce air pollution, improve the environment, increase health and reduce traffic congestion. However, users report problems, such as high prices and uncomfortable bikes. Many older adults did not dare ride bicycles because they thought they were not safe on the streets. This is comparable to Ahmad et al. (2019), who indicated that cycling was the least popular mode in Pakistan due to the great importance that the older adults placed on safety, and Engbers et al. (2018), who discussed that cyclists were vulnerable near crossings and bends. Older people pointed out that cycling was not a mode for all seasons, including summer and winter. This is comparable with Bocker et al. (2017), who emphasized weather sensitivities in older people in Greater Rotterdam.

There are few bike routes in Shiraz. Recently, a bike path was built in the city center. However, lack of continuity and visual appeal, on the one hand, and the lack of awareness

about the benefits of cycling and the high desirability of the car, on the other hand, have played a significant role in not welcoming these routes.

In contrast to Zander et al. (2013), who state that older adults in Sydney were less concerned about being vulnerable and falling off their bikes, in this study, one of the main concerns of older adults was falling during walking and cycling. This concern was so great that some stated that they preferred to stay home as often as possible due to their bad experiences. When it came to women cycling, there were conflicting feelings. Many people felt that women should cycle like everyone else in the city. In contrast, others believed women should cycle in certain spaces, such as women's parks, for cultural and religious reasons.

Older drivers believed that the dangerous driving of younger people increased their stress which can cause severe damage to their mental health. The culture of car use is so prevalent in the city that older people used terms like "The king of all mobility modes" to indicate their excessive interest and dependence on cars. They believed that the car had many advantages, such as flexibility, freedom, and time-saving, which was also mentioned in the previous studies (Lord et al., 2011; Steg, 2005). Drivers reported problems, such as other drivers' careless driving and inappropriate behavior, which is also mentioned in the previous studies (Ahmad et al., 2019; Ipingbemi, 2010). Soltani et al. (2018) state that four factors have led to the high reliance of older adults on their cars in Shiraz: Segregation of urban land uses; changes in the structure of households in Iranian society from extended families to nuclear families; forcing the older adults to rely on themselves; older adults continuing to work after retirement age due to high inflation, lack of purchasing power, and inadequate welfare system; and the inefficiency of the public transportation system. The older adults reported that the car was the best mode to travel to health centers, which is consistent with Du et al. (2020) finding that very sick older persons prefer to use cars for medical travel. However, some older people feared that environmental pollution caused by congestion might have irreversible effects on their health.

The rate of personal car and driver's license ownership was lower among older women than men, so many of the women interviewed depended on their husbands or other family members to meet their mobility needs. As a result, older women, especially those who reside outside the city center and have limited mobility alternatives, face several mobility difficulties when separated from their husbands or other family members. In general,

older men were more inclined to drive and, in fact, regarded driving as part of their masculine identity, while older women preferred to be car passengers.

Another factor that increases the tendency to use cars is the city's inefficient public transportation system. Concerning the bus system, factors such as uncomfortable seats, poor ventilation, long waiting time, bad behavior of drivers or passengers, and the height of the steps are some of the issues that seem to affect the attitudes of older adults significantly, which is also mentioned in the previous studies (Ahmad et al., 2019; Du et al., 2020; Ipingbemi, 2010; Olawole & Aloba, 2014; Yuan et al., 2019). Older adults stated that the absence of adequate ventilation, heating, and cooling systems in buses would worsen their respiratory and cardiovascular problems and harm their physical health. Public transport unreliability is a common complaint, but older people have additional difficulties due to physical constraints. Older adults pointed out that the bus is more affordable than other mobility modes, which is not consistent with Olawole and Aloba (2014), who noted that older adults living in Osogbo, Nigeria, believed that one of the barriers was the high fares for public transportation. The bus fare is about 20000 Rials (0/47 USD) in Shiraz, while the taxi fare is about 20000 Rials for each kilometer. However, older adults did not like to use the bus because of the inefficiency of the bus system. Many respondents pointed out that the metro has many positive features. However, high steps and lack of elevators and escalators in some stations can cause physical problems like shortness of breath and knee pain in older adults, negatively impacting their health.

Despite the popularity of online taxis among young people in recent years in Shiraz, older adults are unwilling to use them due to the problems with smartphones and applications. Therefore, some older adults feel insecure and stressed about using online taxis. They referred to the anecdotal accounts about online taxi drivers abusing passengers.

6. Conclusion

This research aimed to investigate older people's attitudes towards different mobility modes in Shiraz. Therefore, we interviewed older adults living in various urban districts and used thematic analysis to categorize their thoughts on various modes of mobility. Five main themes were extracted based on the thematic analysis, including environmental, socio-cultural, operational, economic, and health factors.

Designing efficient public spaces can encourage older people to walk and cycle, which can improve their health. One of the main problems that older adults face in Shiraz is the pedestrian overpasses with many steps and steep slopes that they cannot use due to their physical and respiratory problems. Therefore, older adults must cross the roadway, resulting in catastrophic vehicle crashes. Providing escalators and elevators for pedestrian overpasses might encourage older people to use them. Moreover, older adults fear being assaulted by other individuals or stuck by motorbikes on urban sidewalks and pathways, particularly at night. Improving the lighting of sidewalks and using surveillance cameras can increase the safety of older adults on sidewalks. Furthermore, sidewalks should be well maintained and wide enough for older adults to move easily with a cane or walker. Besides, using countdown crossing signals can increase the safety of older adults at intersections. However, the slow walking speed of the older adults should be considered when planning the crossing time. Furthermore, signalized and protected bike lanes can encourage older people to cycle in the city.

It is also necessary to improve the driving safety of older adults by incorporating autonomous features into vehicles. Moreover, using up-to-date driving skills assessment techniques, the essential skills should be taught to older drivers, and the drivers who are unable to continue driving should be encouraged to stop driving and use alternative mobility modes.

Public transportation can be a good option for older adults if it is well designed and suited to the physical condition of older adults. Public transport stations should have shelters, route maps, and timetables. Furthermore, the buses should be low-floored and provide priority seats for older adults. Elevators and escalators may be used to alleviate the metro's most pressing issue: its steep staircases. Moreover, due to the respiratory problems of certain older persons, public transportation must be equipped with adequate ventilation systems. Factors such as respecting older adults (offering them seats), drivers' attention to older adults, and giving them sufficient time to get off and sit down are also important. Taxi is not an affordable mode for all older people. Therefore, there should be governmental support for older adults. Training programs can also help familiarize older adults with new technologies, such as online taxis.

If the city provides the required infrastructure for sustainable mobility modes like walking and cycling, older adults will experience active aging, which can help their

healthy aging. We hope that urban planners and policymakers in Shiraz and other cities similar to Shiraz will use these ideas to create more efficient environments for older adults.

We should consider the research's limitations. We did not interview older adults with limited mobility who were at home, and those interviewed were active in urban spaces. Furthermore, most of the people interviewed were 60-70 years old. In addition, older adults living in the suburbs farther away from the city center were not interviewed. Access to older adults was difficult in terms of Covid-19 pandemic conditions. Moreover, in terms of cycling, as the share of this mode is low and most of the older adults have not cycled so far, they did not provide detailed views on this mobility mode.

Since older people are not a homogeneous group, we suggest that age differences among different groups of older people be considered for future research. In addition, since women face more mobility constraints, conducting comparative studies on the attitudes of women and men can provide valuable results. In addition, given the size of the city, it is proposed that interviews be performed with elderly residents of various city neighborhoods, particularly the suburbs. Using quantitative approaches to assess the data may also provide more generalizable results.

7. ETHICS STATEMENT

This study was reviewed and approved by Tarbiat Modares University Institutional Review Board. The participants provided their written informed consent to participate in this study.

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