International Journal of Architectural Engineering & Urban Planning, Volume 33, Number 1, 2023
DOI: 10.22068/ijaup.676

Review Paper

A Systematic Review of the Factors Affecting Elderly Mobility in Urban Spaces

Niloofar Panahi [1], Mohammadreza PourJafar [1*], Ali Soltani [2], Ehsan Ranjbar [1]

[1] *Department of Urban Planning, Faculty of Art and Architecture, Tarbiat Modarres University, Tehran, Iran*

[2] *Department of Urban Planning, Faculty of Art and Architecture, Shiraz University, Shiraz, Iran*

Received: July 2021, **Revised:** May 2022, **Accepted:** July 2022, **Publish Online:** July 2022

Abstract
The aging of the population in developed and developing countries calls for special attention to improve the quality of life for older people. Meanwhile, one of the key factors influencing the quality of life of older people is their mobility. Most of the previous studies have considered the mobility of younger people while considering the aging of the population, the mobility of older people needs special attention. This research aims to investigate the factors affecting older adults' mobility in urban spaces. Thus, we examined Sage, Science Direct, Wiley, Taylor and Francis databases. Initially, 300 papers were gathered. In the following steps, after a more detailed review of the content of the papers and the removal of the unrelated ones, 28 papers remained which had the most relevance to the subject, and content analysis was done. The content analysis results show that the factors affecting elderly mobility are personal factors, lifestyle and attitudinal factors, and built environment factors. Finally, the model of the factors affecting elderly mobility is proposed. According to this model, the three factors proposed can affect the mobility of older adults directly and indirectly. Our findings add to the growing research on investigating older adults' mobility factors. If urban planners get familiar with the factors affecting the mobility of older people in urban spaces, they can lead people to more sustainable modes of mobility and decrease car orientation in urban areas. Therefore, in future policies, the role of all the factors in the mobility of older people should be considered because the restriction of mobility can prevent the active participation of individuals in social activities and ultimately create feelings of depression and social isolation.

Keywords: *Attitude, Built environment, Lifestyle, Mobility, Older adults, Personal factors.*

1. INTRODUCTION

Population aging is a common, significant, and unavoidable trend worldwide, mainly due to increased life expectancy and decreased birth rate. The World Health Organization reports that the proportion of people aged 60 and over is increasing more rapidly than in other age groups. By 2050, the elderly population is estimated to reach 2 billion people; this means that one out of every five people in the world will be old (World Health Organisation, 2002). This trend is not only unique to developed countries but also is happening at a considerable rate in many developing countries. According to the World Health Organization, by 2050, 80% of older people will live in developing countries (World Health Organisation, 2011).

Therefore, it is necessary and not a luxury for all countries to consider indicators to improve the health and activity of older people (World Health Organisation, 2011). In this regard, one of the issues that urban planners and policymakers should consider is the mobility of the elderly; since the elderly have unique movement patterns, and aging may create obstacles to their active mobility. In fact, a major component of healthy aging is active participation in daily activities (Kizony et al., 2020).

* *Corresponding author: pourja_m@modares.ac.ir*

It is predicted that the increase in the elderly population will have an increasing impact on the transportation system, which is both the result of the relative and absolute increase of the elderly population and the socio-cultural and economic characteristics of the older adults (Haustein & Siren, 2015a). Moreover, the elderly are a heterogeneous group with different mobility needs, some of whom may have limited mobility (Panahi et al., 2022).

Mobility restrictions can affect people's health in different ways. Lack of physical activity in older adults can lead to muscle loss, decreased bone density, and increased fat (Rosso et al., 2011). Therefore, early diagnosis of movement restrictions in elderly people and effective interventions to reduce movement restrictions are important (Freiberger et al., 2020).

The World Health Organization (World Health Organisation, 2011) also emphasizes that with the increase in the elderly population, the possibility of being killed or injured in traffic accidents has become a significant challenge for older adults. In this regard, questions are raised about the severity of traffic hazards for the elderly, high-risk locations, high-risk times, the most vulnerable subgroups, and improving traffic safety. Thus, it is essential to pay attention to the mobility of the elderly and their safety, as restrictions on movement can prevent older adults from engaging in social and cultural activities, resulting in feelings of depression and loneliness (Haustein & Siren, 2015b). Another point is that with the increase in the number of elderly, the number of elderly drivers also increases; because there is an increasing tendency to use a private car among this group, and also the number of elderly women with a license is increasing (Marie Dit Asse et al., 2014). For a significant number of elderly people, driving is necessary to maintain quality of life and independence; especially for elderly people living in small towns and rural areas who may have fewer transportation options available (O'Connor et al., 2013).

However, for many people entering old age, giving up driving is a decision that must be made at some point. At first, giving up driving was considered a positive behavior model, which was accompanied by positive comments. But recently, the understanding of the negative consequences of stopping driving for elderly people such as social isolation reduced social participation and quality of life and loss of sense of independence (Siren et al., 2004) and reducing the quality of health (O'Connor et al., 2013) has caused the desire and tendency to increase the period of safe driving and prevent premature stopping of driving (Haustein and Siren, 2015). 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).

Therefore, maintaining the efficient mobility of older people is of particular importance to ensure their active presence in social life and enable human interactions that promote their health, wellbeing, and quality of life. In this regard, it is necessary to adopt policies to support the elderly to maintain their ability to move in an aging population. This is especially important for low-income seniors who do not have a private car or a driving license and have medical impairments.

Therefore, identifying the factors affecting the mobility of the elderly can play an essential role in future urban policies. Many previous studies have paid attention to the factors affecting the mobility of younger people, while considering the increasing trend of population aging, it is very important to investigate the factors affecting the mobility of elderly people. In this research, using the content analysis method, the factors affecting the mobility of older adults in urban spaces are extracted based on articles published between 2010 and 2020. Considering the increasing number of articles that have been published in the field of older peoples' mobility in the last 10 years, carrying out a systematic review can provide us with many points regarding existing trends and existing gaps. Moreover, identifying the older adults' mobility factors can help urban planners to provide policies to promote the mobility of older people and encourage them to use more sustainable modes of mobility.

2. MATERIALS AND METHODS

In this study, the content analysis method is used to examine the articles. Content analysis is a targeted and systematic method of explaining events to provide information, new ideas, and representations of events. This method is a textual data analysis process that converts diverse and dispersed data into detailed and rich data. In fact, the Content analysis identifies, analyzes, and points out trends in qualitative data. This approach involves three main steps of preparing, organizing, and reporting (Elo & Kyngäs, 2008).

In this research, in the preparation stage, using the keywords 'elderly people', 'mobility', 'transportation', 'older adults', 'older people', and 'gerontology' articles published from 2010 to 2020 in the databases of Sage, Science Direct, Wiley, and Taylor and Francis were searched. The search resulted in finding 300 articles that were reviewed to see whether they were related to the research topic.

After removing the completely irrelevant articles, 260 articles remained, and after examining their abstracts, 70 most related articles were selected.

In the next step, the articles were reviewed in greater detail; 20 articles were removed because their study samples were not people aged 60 and over or their samples sizes were not mentioned or were insufficient, and 22 articles were removed because they were related to the field of medicine or they considered the mobility of the elderly at home or rural areas. Finally, 28 articles remained for the analysis. The selection process of these articles is shown in Figure 1. After reviewing the articles and extracting the mobility factors, the open coding method was used to reduce the data, and the data were classified, categorized, and summarized. Finally, the factors affecting elderly mobility were presented.

Based on the citation data output from the databases, co-authorship (Fig.2) and co-occurrence (Fig.3) networks were produced using VOS viewer software. The co-authorship network represents the authors of the articles and their colleagues. This chart helps to identify active authors in this field. The co-occurrence network shows the frequency of repetition of different words in the abstract of the articles. Words such as 'elderly', 'adults', 'mobility', 'suburbs', 'health status', 'travel choice', and 'travel frequency' are repeated frequently in the papers. The frequency of articles by journal name is also shown in Figure 4. Most of these articles are from Science Direct and Sage databases and the journals of Transport Geography, Transportation Research Record, and Applied Gerontology. This analysis showed that some journals have paid special attention to the issue of older adults' mobility in recent years, and most of these journals were indexed in Sage and Science Direct databases. Therefore, if researchers tend to do research in this field, they can refer to these databases and journals.

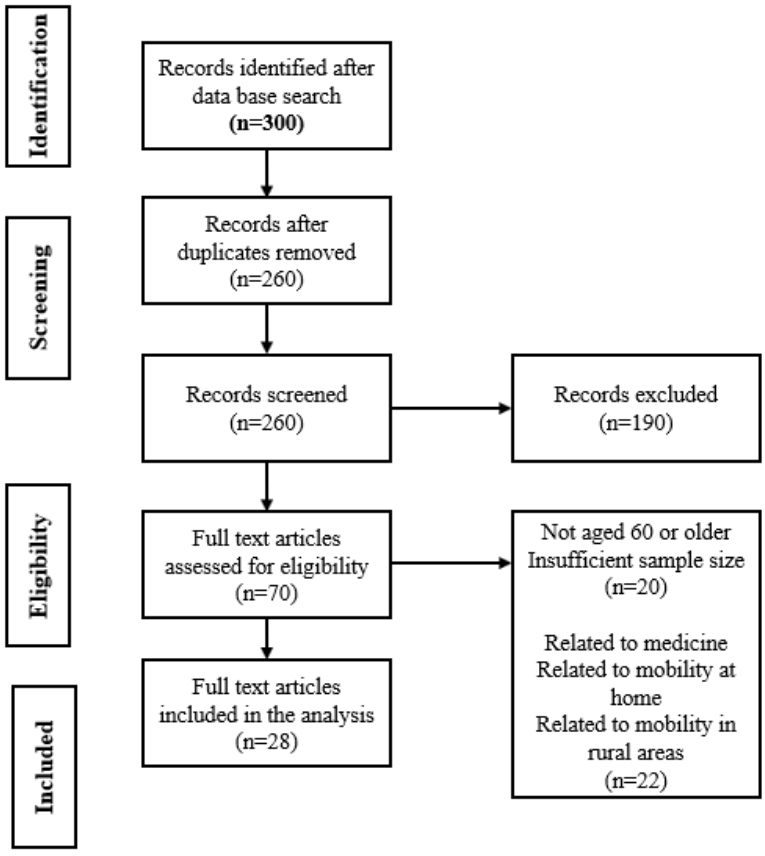

Fig 1. The Process of Selecting the Papers

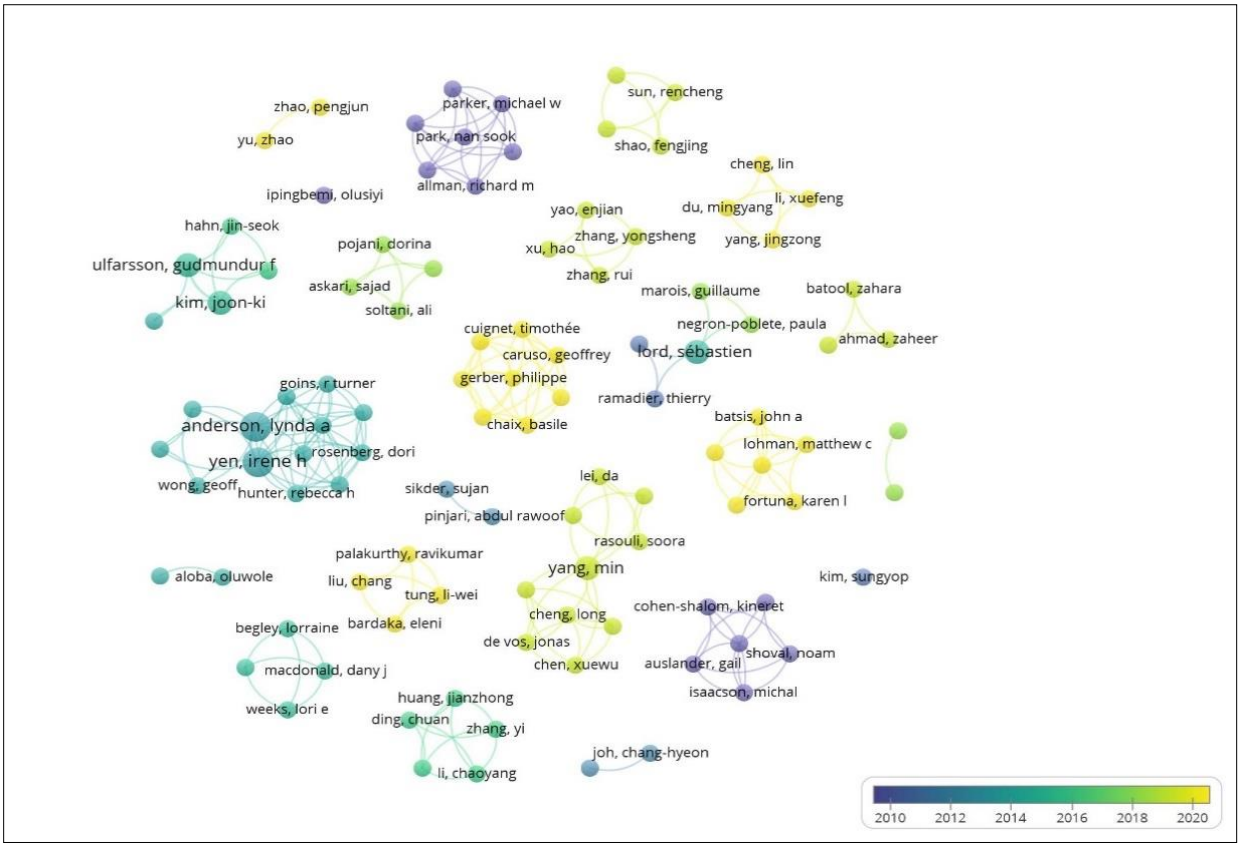

Fig 2. Co-authorship Network

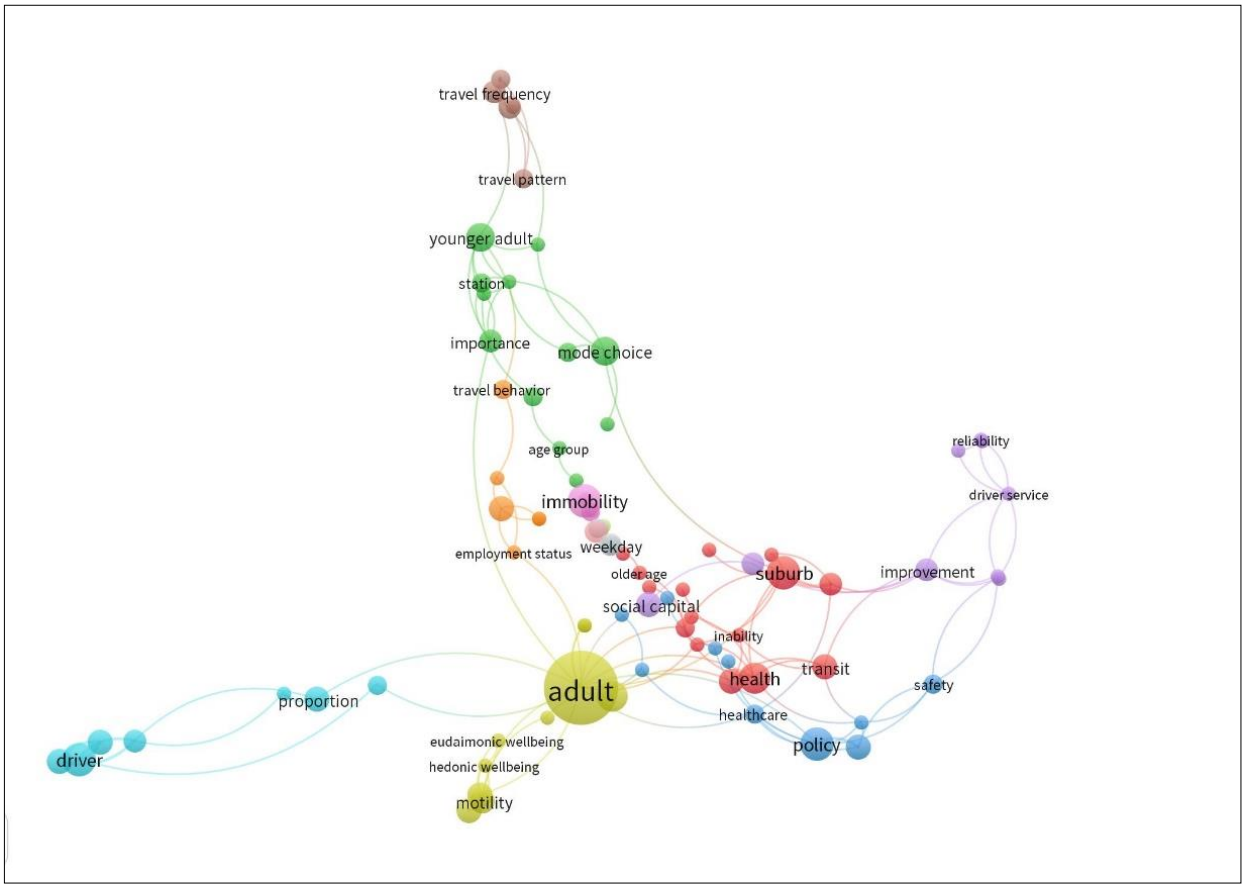

Fig 3. Co-occurrence Network of Keywords

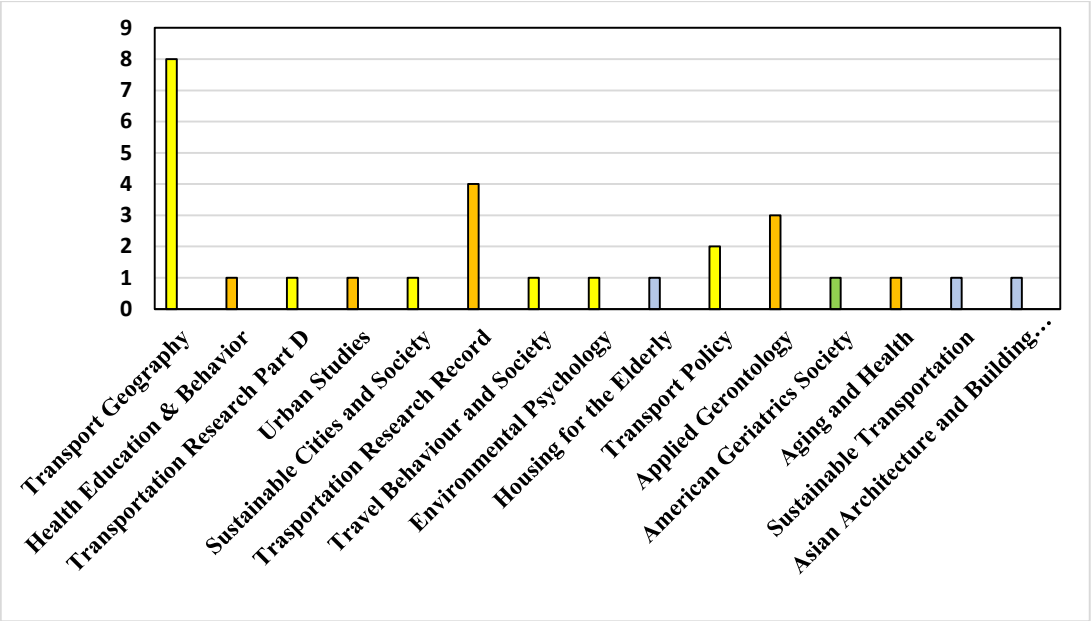

Fig 4. Frequency of the papers per journal and database (The yellow color shows science direct database (14 papers), the orange color sage (10 papers), the blue color Taylor and Francis (3 papers), and the green color Wiley (1 paper))

3. RESULTS AND DISCUSSION

According to the content analysis, the factors affecting the mobility of older people in urban spaces can be categorized into personal factors, lifestyle and attitudinal factors and built environment factors.

3.1. Personal Factors

According to the articles, personal factors including age, income, education, occupation, gender, driver's license ownership, race, and health can affect older peoples' mobility. Among these factors, age, income, and gender have been more frequent in studies. Older people are more likely to experience mobility limitations (Kim et al., 2014; Marois et al., 2018; Noh and Joh, 2012; Ranković Plazinić and Jović, 2018). However, according to (Ahmad et al., 2019b), old age does not necessarily reduce mobility if the older adults are in good health status.

Also, according to studies (Hahn et al., 2016; Kim et al., 2014; Nan Sook Park et al., 2010; Noh and Joh, 2012), older people with higher incomes travel more; while older people with lower incomes face more mobility restrictions; Because they may not have the opportunity to use different mobility modes. According to (Zhang et al., 2019), older people with higher incomes are also more likely to walk. However, according to (Ahmad et al., 2019b; Du et al., 2020a), older people who have more income are more likely to use private cars and are less likely to use public transportation. Maybe this difference is due to the different residential location of people and their distance from the city center, and their access to the required facilities. Also, Ahmad et al. (2019b) state that there is no significant difference between the number of trips of older adults with high incomes and older adults with upper-middle-income, one possible reason is that people with higher incomes may seek help from others to meet their daily needs, thus reducing their mobility.

Education level can also affect the mode choice of the elderly; According to studies, older people with higher education levels are more likely to use modes such as walking and public transportation and less likely to use a private car (Du et al., 2020b; Noh and Joh, 2012; Zhang et al., 2019). In addition, travel time is more critical for employed seniors than retired seniors, which may affect their mode choice (Liu et al., 2020).

Gender can also affect the mobility of older people. Some studies suggest that women are more likely to face mobility restrictions (Kim et al., 2014; Zhao & Yu, 2020); One possible reason for this could be the lower tendency of women to continue driving at an older age and also the feeling of fear and insecurity in women while driving. Also, in countries such as Pakistan (Ahmad et al., 2019a), women face more mobility challenges because they need permission from men to travel; However, some studies (Cheng et al., 2019; Hahn et al., 2016) state that women travel frequency for all age groups is more than men, except for the population over 75 years. Also, according to Zhang et al. (2019), older men are more likely to use modes

such as cycling. Some studies also believe that racial differences can affect the mobility of older adults (Nan Sook Park et al., 2010; Vásquez et al., 2020). For example, non-Hispanic blacks face more mobility restrictions than non-Hispanic and Hispanic whites.

Another factor influencing the mobility of the elderly is the ownership of a driving license and a private car. According to (Ahmad et al., 2019a; Cuignet et al., 2020; Ranković Plazinić & Jović, 2018), having a driving license can positively affect older adults' sense of independence and quality of life. Having a driving license is even more important in low-access areas such as suburbs. Also, people who have a license and a private car are less inclined to use non-motorized mobility modes (Liu et al., 2020).

According to the studies, the health status of the elderly can also affect their mobility. For example, people with physical disabilities or cognitive impairments have more mobility challenges (Kim, 2011; Lord et al., 2011; Noh & Joh, 2012; Shoval et al., 2010; Sikder & Pinjari, 2012) and are more likely to use private cars and taxis (Du et al., 2020a). Visual problems can also create many constraints on the mobility of the elderly (Weeks et al., 2015). These problems increase the likelihood of falling while walking and using public transportation and crashing while driving for older adults.

3.2. Lifestyle and Attitudinal Factors

According to the studies, some of the factors affecting the mobility of older people are rooted in their lifestyles and attitudes. For example, the household structure can influence the mobility pattern of older people; older people living alone and unaccompanied are more likely to travel to meet their daily needs and are more likely to face mobility restrictions than older people living in large families (Kim et al., 2014; Marois et al., 2018; Ranković Plazinić & Jović, 2018; Weeks et al., 2015). Also, according to (Soltani et al., 2018), there is an inverse relationship between household size and car use.

The attitude of the elderly towards different mobility modes such as walking, public transportation, cycling, and the private car can also affect their mobility patterns; For example, some seniors believe that the private car reflects the high social status of individuals and has benefits such as freedom, comfort, and independence; so they like to use their private cars and may experience depression and social isolation when they give up driving (Cheng et al., 2019; Kim et al., 2014; Lord et al., 2011; Zhang et al., 2016).

Furthermore, factors such as the careless driving of other drivers and showing disrespect for elderly drivers reduce the willingness of older people to drive, and in many cases, the older people give up driving while still able to drive. In the absence of proper infrastructure for mobility, it can cause many problems for older people to perform their daily activities. Studies also show that older people with environmental concerns are more attracted to non-motorized mobility modes (Ahmad et al., 2019b; Ipingbemi, 2010).

Regarding public transportation, the feeling of security, convenience, and comfort of the elderly while using the vehicles can greatly impact their use. The functional limitations of older passengers increase the probability of being injured while using public transit; thus, drivers should give seniors enough time to go down and up. Fear of crime also has a significant impact on restricting the use of public transport by older people, as older people are often the primary victims of crime.

In addition, older travelers are usually more susceptible to environmental changes due to their health status; Statistics show that crowded spaces can cause annoying problems like heart problems for the elderly. Also, with age, people become more sensitive to factors such as walking distance, ease of movement, and waiting time. Meanwhile, the cleanliness of public transport has a significant impact on the attitude of older adults. Factors such as showing respect for the elderly (offering them seats), drivers' attention to the elderly, and giving them enough time to get on and off the bus also have a significant impact (Ahmad et al., 2019b; Du et al., 2020b; Ipingbemi, 2010; Olawole & Aloba, 2014; Yuan et al., 2019).

3.3. Built Environment Factors

Research indicates that older people living in densely populated areas tend to travel more than people living in areas with lower densities. Living in densely populated neighborhoods also encourages older people to use non-motorized modes such as walking and cycling (Cheng et al., 2019; Shao et al., 2019; Yen & Anderson, 2012).

Mixed land uses can also affect the mobility patterns of the elderly. Older people who live in areas with high mixed-use are more inclined to use non-motorized modes (Shao et al., 2019; Soltani et al., 2018; Yen et al., 2014). Some urban design factors can encourage people to use different mobility modes; For example, complete streets, traffic calming and continuous sidewalks, locating shopping centers, parks or green spaces, and recreational services and facilities within walking distance in neighborhoods are among the factors that can encourage older people to travel more, especially in non-motorized modes (Anderson et al., 2014; Yen

et al., 2014; Yen & Anderson, 2012); such policies increase the elderly's sense of safety and comfort and increase their motivation to move.

In general, mobility in high-access settlements is more than mobility in low-access settlements. In high-access settlements, older adults use non-motorized mobility modes rather than private cars (Liu et al., 2020; Zhang et al., 2016). Furthermore, older people living in suburban and rural areas are more dependent on cars (Ranković Plazinić & Jović, 2018). Also, for short distances (less than 2 km), the elderly walk more and for long distances (more than 2 km), use other modes such as public transportation (Du et al., 2020a).

The location of public transportation stations and the distance from the nearest stations also have a significant impact on the use of public transportation; Older people who do not have good access to stations may use their private car or prefer not to travel at all (Ahmad et al., 2019b; Ipingbemi, 2010; Liu et al., 2020). In addition, appropriate facilities for the access of older people with physical and mental disabilities to public transportation increase their desire to use public transportation. In this regard, priority seats for the elderly should be considered, and it should be possible for the elderly to enter easily with wheelchairs and other assistive devices (Ahmad et al., 2019b; Anderson et al., 2014; Shao et al., 2019). High fares of public transportation, inadequate public transportation facilities, and improper vehicle design (height of the stairs from the ground) reduce the willingness of older people to use public transportation.

Soltani et al. (2018) state that the elderly who live in areas of the city with higher average land prices and higher average incomes make more trips by car. Also, according to Du et al. (2020a), older people who have lived in the same area for a long time (20 years or more) are less likely to experience transportation restrictions; This may be due to their social networks.

Table 1. Older Adults' Mobility Factors

Author (year)	Personal factors								Attitudinal and lifestyle factors		Built environment factors					
	Age	Income	Education	Job	Gender	Driving License	Race	Health	Family structure	Attitude	Density	Mixed use	Design	Accessibility	Public Transport	Land Price
Du et al. (2020)		*	*					*		*				*		
Liu et al. (2020)			*	*		*							*	*	*	
Zhao and Yu (2020)					*											
Cuignet et al. (2020)						*				*						
Vasquez et al. (2020)							*									
Cheng et al. (2019)	*				*					*	*					
Zhang et al. (2019)		*	*													
Ahmad et al. (2019)		*			*	*				*					*	
Shao et al. (2019)											*	*			*	
Yuan et al. (2019)										*						
Plazinic and Jovic (2018)	*					*			*				*	*		
Soltani et al. (2018)									*		*				*	*
Marios et al. (2018)	*								*							
Hahn et al. (2016)		*			*											
Zhang et al. (2016)										*				*		
Weeks et al. (2015)								*	*							
Kim et al. (2014)	*	*			*				*	*						
Olawole and Aloba (2014)										*						
Yen et al. (2014)											*		*			
Anderson et al. (2014)													*		*	
Noh and Joh (2012)	*	*	*					*								
Skider and Piniari (2012)								*	*							
Yen and Anderson (2012)											*		*			
Lord et al. (2011)								*		*						
Hahn et al. (2016)								*								
Ipingbemi (2010)								*		*						
Shoval et al. (2010)								*								
Park et al. (2010)		*					*									

4. CONCLUSION

In this research, an overview of the studies related to the mobility of older people was discussed and the factors influencing mobility were extracted based on these studies. The analysis of the articles showed that these articles are generally concerned with the impact of two categories of objective and subjective factors on mobility. It is necessary to mention that, in addition to the effect of these two categories of components on the mobility patterns of older people, these components themselves are also related to each other. In such a way that the objective components can affect the subjective components and vice versa. Our study shows that it is very important to have an integrated view of all these factors because a one-dimensional view and emphasizing one group of factors and neglecting another group can cause many problems for the mobility of older people. The factors affecting the mobility of the elderly in urban spaces are shown in Figure 5.

In fact, mobility is a complex and multi-level concept, and if urban planners aim to increase the efficiency of the intra-city mobility system, they must pay attention to the role of all these factors in the mobility of people. One of the advantages of familiarizing urban planners with the factors affecting the mobility of older people in urban spaces is that they can lead people to more sustainable modes of mobility.

Since population aging is not limited to developed countries and is occurring rapidly even in developing countries, planning to increase the quality of life of older people and improve their mobility to perform their daily activities is of particular importance.

Short-term and long-term policies can be considered to reduce the restrictions on the mobility of the elderly. Short-term policies include improving the sidewalks, increasing the quality of public transport facilities, improving the condition of bus stops, and strengthening traffic laws to monitor the performance of young drivers, and long-term policies, include improving vehicle design, providing special seats for the elderly, improving the access by assistive devices such as wheelchairs and walkers, providing subsidies for the older adults and adopting appropriate transportation policies to manage the mobility crisis in the older adults.

In adopting policies and increasing the physical access of older people to various destinations, attention should be paid to increasing perceptual access (for example, access to information related to public transportation) and increasing the social inclusion of development programs. As older women may face more mobility problems, these policies can be of great benefit to them. It is also essential to have training programs for the drivers and passengers to treat the elderly properly. Failure to consider these factors can negatively affect the mentality of older people and limit their mobility, which may result in many problems such as social isolation and depression.

We suggest that future researchers pay special attention to the role of subjective factors such as attitude in older peoples' mobility. It would also be interesting to make comparative comparisons between the mobility patterns of older adults and young people. Moreover, since older women are facing more mobility restrictions, the research on the factors affecting the mobility of older women can provide us with important points regarding the challenges faced by older women.

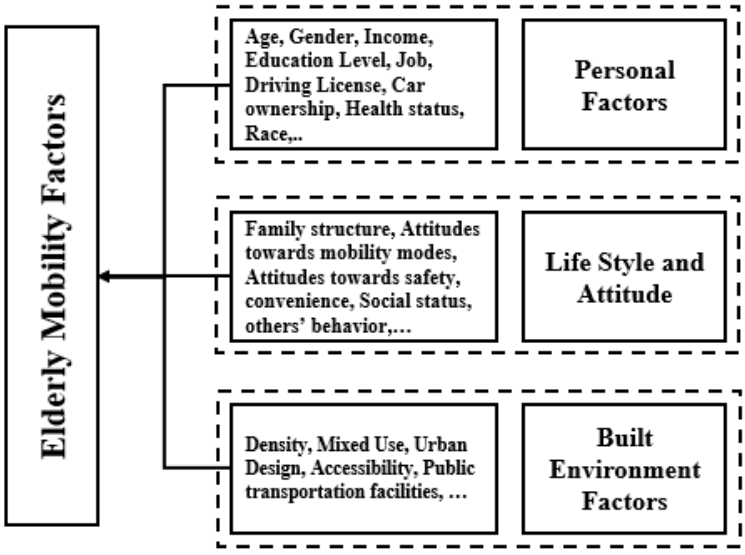

Fig 5. Elderly Mobility Factors

REFERENCES

Ahmad, Z., Batool, Z., Starkey, P., 2019a. Understanding mobility characteristics and needs of older persons in urban Pakistan with respect to use of public transport and self-driving. Journal of Transport Geography 74, 181–190. https://doi.org/10.1016/j.jtrangeo.2018.11.015

Ahmad, Z., Batool, Z., Starkey, P., 2019b. Understanding mobility characteristics and needs of older persons in urban Pakistan with respect to use of public transport and self-driving. Journal of Transport Geography 74, 181–190. https://doi.org/10.1016/j.jtrangeo.2018.11.015

Anderson, L.A., Slonim, A., Yen, I.H., Jones, D.L., Allen, P., Hunter, R.H., Goins, R.T., Leith, K.H., Rosenberg, D., Satariano, W.A., McPhillips-Tangum, C., 2014. Developing a Framework and Priorities to Promote Mobility Among Older Adults. Health Educ Behav 41, 10S-18S. https://doi.org/10.1177/1090198114537492

Cheng, L., De Vos, J., Shi, K., Yang, M., Chen, X., Witlox, F., 2019. Do residential location effects on travel behavior differ between the elderly and younger adults? Transportation Research Part D: Transport and Environment 73, 367–380. https://doi.org/10.1016/j.trd.2019.07.015

Cuignet, T., Perchoux, C., Caruso, G., Klein, O., Klein, S., Chaix, B., Kestens, Y., Gerber, P., 2020. Mobility among older adults: Deconstructing the effects of motility and movement on wellbeing. Urban Studies 57, 383–401. https://doi.org/10.1177/0042098019852033

Du, M., Cheng, L., Li, X., Yang, J., 2020a. Factors affecting the travel mode choice of the urban elderly in healthcare activity: comparison between core area and suburban area. Sustainable Cities and Society 52, 101868. https://doi.org/10.1016/j.scs.2019.101868

Du, M., Cheng, L., Li, X., Yang, J., 2020b. Factors affecting the travel mode choice of the urban elderly in healthcare activity: comparison between core area and suburban area. Sustainable Cities and Society 52, 101868. https://doi.org/10.1016/j.scs.2019.101868

Freiberger, E., Sieber, C.C., Kob, R., 2020. Mobility in Older Community-Dwelling Persons: A Narrative Review. Front. Physiol. 11, 881. https://doi.org/10.3389/fphys.2020.00881

Hahn, J.-S., Kim, H.-C., Kim, J.-K., Ulfarsson, G.F., 2016. Trip making of older adults in Seoul: Differences in effects of personal and household characteristics by age group and trip purpose. Journal of Transport Geography 57, 55–62. https://doi.org/10.1016/j.jtrangeo.2016.09.010

Haustein, S., Siren, A., 2015. Older People's Mobility: Segments, Factors, Trends. Transport Reviews 35, 466–487. https://doi.org/10.1080/01441647.2015.1017867

Ipingbemi, O., 2010. Travel characteristics and mobility constraints of the elderly in Ibadan, Nigeria. Journal of Transport Geography 18, 285–291. https://doi.org/10.1016/j.jtrangeo.2009.05.011

Kim, J.-K., Ulfarsson, G.F., Sohn, K., 2014. Transportation Deficiencies for Older Adults in Seoul, South Korea. Transportation Research Record 2469, 76–88. https://doi.org/10.3141/2469-09

Kim, S., 2011. Transportation Alternatives of the Elderly after Driving Cessation. Transportation Research Record 2265, 170–176. https://doi.org/10.3141/2265-19

Kizony, R., Schreuer, N., Rotenberg, S., Shach-Pinsly, D., Sinoff, G., Plaut, P., 2020. Participation in out-of-home activities among older adults: The role of mobility, attitudes and travel behaviors. Journal of Transport & Health 17, 100846. https://doi.org/10.1016/j.jth.2020.100846

Liu, C., Bardaka, E., Palakurthy, R., Tung, L.-W., 2020. Analysis of travel characteristics and access mode choice of elderly urban rail riders in Denver, Colorado. Travel Behaviour and Society 19, 194–206. https://doi.org/10.1016/j.tbs.2019.11.004

Lord, S., Després, C., Ramadier, T., 2011. When mobility makes sense: A qualitative and longitudinal study of the daily mobility of the elderly. Journal of Environmental Psychology 31, 52–61. https://doi.org/10.1016/j.jenvp.2010.02.007

Marie Dit Asse, L., Fabrigoule, C., Helmer, C., Laumon, B., Lafont, S., 2014. Automobile Driving in Older Adults: Factors Affecting Driving Restriction in Men and Women. J Am Geriatr Soc 62, 2071–2078. https://doi.org/10.1111/jgs.13077

Marois, G., Lord, S., Negron-Poblete, P., 2018. The Residential Mobility of Seniors Among Different Residential Forms: Analysis of Metropolitan and Rural Issues for Six Contrasted Regions in Québec, Canada. Journal of Housing For the Elderly 32, 73–98. https://doi.org/10.1080/02763893.2017.1393488

Mifsud, D., Attard, M., Ison, S., 2017. To drive or to use the bus? An exploratory study of older people in Malta. Journal of Transport Geography 64, 23–32. https://doi.org/10.1016/j.jtrangeo.2017.08.002

Nan Sook Park, Roff, L.L., Sun, F., Parker, M.W., Klemmack, D.L., Sawyer, P., Allman, R.M., 2010. Transportation Difficulty of Black and White Rural Older Adults. J Appl Gerontol 29, 70–88. https://doi.org/10.1177/0733464809335597

Noh, S.H., Joh, C.-H., 2012. Analysis of Elderly Travel Patterns in Seoul Metropolitan Area, South Korea, through Sequence Alignment and Motif Search. Transportation Research Record 2323, 25–34. https://doi.org/10.3141/2323-04

O'Connor, M.L., Edwards, J.D., Bannon, Y., 2013. Self-rated driving habits among older adults with clinically-defined mild cognitive impairment, clinically-defined dementia, and normal cognition. Accident Analysis & Prevention 61, 197–202. https://doi.org/10.1016/j.aap.2013.05.010

Olawole, M.O., Aloba, O., 2014. Mobility characteristics of the elderly and their associated level of satisfaction with transport services in Osogbo, Southwestern Nigeria.

Transport Policy 35, 105–116. https://doi.org/10.1016/j.tranpol.2014.05.018

Panahi, N., Pourjafar, M., Ranjbar, E., Soltani, A., 2022. Examining older adults' attitudes towards different mobility modes in Iran. Journal of Transport & Health 26, 101413. https://doi.org/10.1016/j.jth.2022.101413

Ranković Plazinić, B., Jović, J., 2018. Mobility and transport potential of elderly in differently accessible rural areas. Journal of Transport Geography 68, 169–180. https://doi.org/10.1016/j.jtrangeo.2018.03.016

Rosso, A.L., Auchincloss, A.H., Michael, Y.L., 2011. The Urban Built Environment and Mobility in Older Adults: A Comprehensive Review. Journal of Aging Research 2011, 1–10. https://doi.org/10.4061/2011/816106

Shao, F., Sui, Y., Yu, X., Sun, R., 2019. Spatio-temporal travel patterns of elderly people – A comparative study based on buses usage in Qingdao, China. Journal of Transport Geography 76, 178–190. https://doi.org/10.1016/j.jtrangeo.2019.04.001

Shoval, N., Auslander, G., Cohen-Shalom, K., Isaacson, M., Landau, R., Heinik, J., 2010. What can we learn about the mobility of the elderly in the GPS era? Journal of Transport Geography 18, 603–612. https://doi.org/10.1016/j.jtrangeo.2010.03.012

Sikder, S., Pinjari, A.R., 2012. Immobility Levels and Mobility Preferences of the Elderly in the United States: Evidence from 2009 National Household Travel Survey. Transportation Research Record 2318, 137–147. https://doi.org/10.3141/2318-16

Siren, A., Hakamies-Blomqvist, L., Lindeman, M., 2004. Driving Cessation and Health in Older Women. J Appl Gerontol 23, 58–69. https://doi.org/10.1177/0733464804263129

Soltani, A., Pojani, D., Askari, S., Masoumi, H.E., 2018. Socio-demographic and built environment determinants of car use among older adults in Iran. Journal of Transport Geography 68, 109–117. https://doi.org/10.1016/j.jtrangeo.2018.03.001

Vásquez, E., Germain, C.M., Tang, F., Lohman, M.C., Fortuna, K.L., Batsis, J.A., 2020. The Role of Ethnic and Racial Disparities in Mobility and Physical Function in Older Adults. J Appl Gerontol 39, 502–508. https://doi.org/10.1177/0733464818780631

Weeks, L.E., Stadnyk, R., Begley, L., MacDonald, D.J., 2015. The influence of Driving Status on Transportation Challenges Experienced by Older Adults. J Appl Gerontol 34, 501–517. https://doi.org/10.1177/0733464813487255

World Health Organisation, 2011. Global Health and Aging.

World Health Organisation, 2002. Active Aging: A Policy Framework.

Yen, I.H., Anderson, L.A., 2012. Built Environment and Mobility of Older Adults: Important Policy and Practice Efforts. J Am Geriatr Soc 60, 951–956. https://doi.org/10.1111/j.1532-5415.2012.03949.x

Yen, I.H., Fandel Flood, J., Thompson, H., Anderson, L.A., Wong, G., 2014. How Design of Places Promotes or Inhibits Mobility of Older Adults: Realist Synthesis of 20 Years of Research. J Aging Health 26, 1340–1372. https://doi.org/10.1177/0898264314527610

Yuan, Y., Yang, M., Wu, J., Rasouli, S., Lei, D., 2019. Assessing bus transit service from the perspective of elderly passengers in Harbin, China. International Journal of Sustainable Transportation 13, 761–776. https://doi.org/10.1080/15568318.2018.1512691

Zhang, Y., Li, C., Ding, C., Zhao, C., Huang, J., 2016. The Built Environment and the Frequency of Cycling Trips by Urban Elderly: Insights from Zhongshan, China. Journal of Asian Architecture and Building Engineering 15, 511–518. https://doi.org/10.3130/jaabe.15.511

Zhang, Y., Yao, E., Zhang, R., Xu, H., 2019. Analysis of elderly people's travel behaviours during the morning peak hours in the context of the free bus programme in Beijing, China. Journal of Transport Geography 76, 191–199. https://doi.org/10.1016/j.jtrangeo.2019.04.002

Zhao, P., Yu, Z., 2020. Investigating mobility in rural areas of China: Features, equity, and factors. Transport Policy 94, 66–77. https://doi.org/10.1016/j.tranpol.2020.05.008

AUTHOR (S) BIOSKETCHES

N. Panahi., *Department of Urban Planning, Faculty of Art and Architecture, Tarbiat Modarres University, Tehran, Iran*
Email*: niloofar.panahi@modares.ac.ir*

M.H. PourJafar., *Department of Urban Planning, Faculty of Art and Architecture, Tarbiat Modarres University, Tehran, Iran*
Email*: pourja_m@modares.ac.ir*

A. Soltani., *Department of Urban Planning, Faculty of Art and Architecture, Shiraz University, Shiraz, Iran*
Email*: soltani@shirazu.ac.ir*

E. Ranjbar., *Department of Urban Planning, Faculty of Art and Architecture, Tarbiat Modarres University, Tehran, Iran*
Email*: e_ranjbar@modares.ac.ir*

HOW TO CITE THIS ARTICLE

Panahi, N., PourJafar, M.H., Soltani, A., Ranjbar, E. (2022). A Systematic Review of the Factors Affecting Elderly Mobility in Urban Spaces. *Int. J. Architect. Eng. Urban Plan*, 33(4): 1-11, https://doi.org/10.22068/ijaup.676

URL: http://ijaup.iust.ac.ir