



# A survey of the age-friendly indicators of Kashan city, Iran in 2022

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## Abstract

**Objectives:** This study aimed to assess the age-friendly indicators in Kashan City, Iran in 2022.

**Methods:** This cross-sectional study was conducted in four districts of Kashan City, Iran. Researchers randomly selected 80 locations and used a specific checklist for observation. Data analysis was performed using descriptive statistics.

**Results:** Outdoor buildings and offices scored a mean of  $8.95 \pm 2.25$  out of 20 (range 5-14, 95% CI: 8-10.05), indicating an average condition. Urban roads and transportation scored  $6.10 \pm 2.34$  out of 20 (range 5-10, 95% CI: 5.8-7.0), also showing an average condition. Parks and public spaces received a score of  $7.57 \pm 1.5$  out of 16 (range 6-11, 95% CI: 6.8-8.1), reflecting an average condition. Religious places scored  $10.09 \pm 2.6$  out of 12 (range 7-11, 95% CI: 9.2-10.3), indicating a good condition.

**Conclusion:** The majority of outdoor buildings and offices, urban roads and transportation, as well as recreational and religious spaces in Kashan City do not meet the necessary standards for an age-friendly environment. These findings highlight areas that require improvement to enhance the health, activity, and quality of life for the elderly population.

**Keywords:** Aging, Indicators, Old age security, City planning.

## Introduction

The global population of older individuals is projected to increase from 12% in 2015 to 22% by 2050.<sup>[1]</sup> In Iran, approximately 9% of the population comprises older people. Aging often diminishes individuals' ability to adapt to their surroundings.<sup>[2]</sup> Environmental factors can heighten the risk of falls and accidents among older adults.<sup>[3]</sup> Therefore, it is crucial to prevent such incidents and ensure a safe environment for this demographic group.<sup>[4]</sup> Implementing age-friendly criteria can play a pivotal role in creating a secure environment for older adults.<sup>[5]</sup>

In 2007, the World Health Organization (WHO) introduced guidelines outlining the characteristics of age-friendly cities globally to prevent the exclusion of older adults from society. This framework has served as a roadmap for enhancing living conditions for older individuals in numerous countries, with 20% of WHO member nations, including Canada, incorporating it into their urban planning efforts.<sup>[6]</sup> WHO defines age-friendly cities as urban areas where public services are strategically distributed to align with the needs and constraints of older

individuals.<sup>[7]</sup> Various assessment scales have been developed to evaluate cities in this context, with the WHO scale being the most prominent, encompassing eight criteria such as open urban spaces, outdoor buildings, transportation, safety, social inclusion, civic engagement, healthcare access, and cultural and recreational opportunities.<sup>[8-10]</sup>

However, the studies employed different scales to assess the age-friendly indicators of cities based on their specific objectives. Some studies utilized checklists and conducted observations to gather data, while others sought input from older adults or experts.<sup>[11-13]</sup> For instance, a study in Brazil revealed that only 16 cities met the requirements set by the WHO.<sup>[14]</sup> Despite the growing elderly population in Iran and the WHO's recommendations, there have been limited studies conducted in the country to evaluate the age-friendliness of cities.

One study highlighted that Gorgan city in Iran fell short of WHO standards, particularly in areas such as information and communication, and outdoor buildings and open spaces.<sup>[15]</sup> Similarly, another study concluded that Kermanshah was not considered an age-friendly

city.<sup>[12]</sup> In contrast, research conducted in Mashhad demonstrated that all social, cultural, and recreational indicators aligned with WHO guidelines.<sup>[13]</sup>

Conversely, a more recent study in 2022 reported subpar ratings for social, cultural-recreational, and communicative indicators in Kashan.<sup>[16]</sup> Notably, a common drawback identified in previous studies was the reliance on questionnaires for data collection, lacking direct environmental observations. Additionally, findings indicated conflicting perspectives between authorities and older individuals regarding what constitutes an age-friendly city.<sup>[12]</sup>

Assessing a city's adherence to standard indicators is a crucial initial step toward obtaining an age-friendly city certification. Given Kashan's higher aging growth rate compared to the national average<sup>[17]</sup> and its rich historical and cultural heritage, the pursuit of age-friendly city status holds particular significance in this context.

## Objectives

The absence of prior investigations in this area motivated us to explore the extent to which age-friendly city characteristics are being implemented in Kashan.

## Methods

This cross-sectional study was conducted in Kashan, Iran, between May and June 2022. The city of Kashan was divided into four geographical districts (North, South, East, West) based on an online geographical map,<sup>[18]</sup> with 20 locations randomly selected from each district. These locations included outdoor buildings and offices, roads, parks and public spaces, and religious places. The sample size was determined based on a previous study where the mean and standard deviation of one of the age-friendly criteria were 2.56 and 0.94, respectively.<sup>[16]</sup> Using a margin of error of 0.5 with a standard deviation of 0.94, the sample size was initially calculated at 14 for each district [Formula 1]. However, to ensure robustness, 20 locations were chosen and observed in each district. A neutral individual, unaware of the study's objectives, selected 20 locations from each category using the online geographic map of Kashan city.

$$\text{Formula 1} \quad n = \frac{\left(z_{1-\frac{\alpha}{2}}\right)^2 * \sigma^2}{d^2} = 14$$

The inclusion criteria required that the selected places were accessible and not undergoing repairs at the time of observation. Due to the unique characteristics of outdoor buildings and offices, roads, parks and public spaces, and religious places, four checklists of age-friendly indicators were developed by the researchers through a

comprehensive review of the literature.<sup>[8,19]</sup> Four checklists (one for each domain) with binary responses (yes or no) were created to assess outdoor buildings and offices (20 items with a score range of 0 to 20), urban roads and transportation (20 items with a score range of 0 to 20), parks and public spaces (16 items with a score range of 0 to 16), and religious places (12 items with a score range of 0 to 12). Rose's criterion was employed to categorize the condition of the observed places. According to Rose et al., the total score was divided into four quartiles (bad, average, good, excellent), each representing 25% of the total score.<sup>[20]</sup> For outdoor buildings and offices and urban roads and transportation, scores between 0-5 were classified as bad, 6-10 as average, 11-15 as good, and 16-20 as excellent. Similarly, for parks and public spaces, scores between 0-4 were considered bad, 5-8 average, 9-12 good, and 13-16 excellent. For religious places, scores between 0-3 were categorized as bad, 4-6 average, 7-9 good, and 10-12 excellent.

The checklists were completed through direct observation, and their content validity was confirmed by ten geriatric care experts from Kashan Nursing School. The content validity index (CVI) for the checklist items was determined using the Lawshe method. The content validity ratio (CVR) for the outdoor buildings and offices, roads, parks and public spaces, and religious places checklists ranged from 0.79 to 0.94. The checklist demonstrated a reliability of 0.82 as measured by the Kuder-Richardson formula 20.

Data analysis was conducted using descriptive statistics such as frequency, mean, percentage, standard deviation, and (version 16.0, SPSS Inc, Chicago, IL, USA).

The study was conducted in accordance with the Declaration of Helsinki. The study was approved by the ethics committee of Kashan University of Medical Sciences (Code: IR.KAUMS.REC.1396.53). To maintain confidentiality, codes were used instead of the names of the observed locations.

## Results

The study examined 20 outdoor buildings and offices, 20 urban roads, 20 parks and public spaces, and 20 religious places to evaluate the indicators of an age-friendly city. Outdoor buildings and offices received a score of  $8.95 \pm 2.25$  out of 20 (range 5-14, 95% CI: 8-10.05), indicating average age-friendly indicators. The highest percentage was attributed to the presence of public prayer rooms, while the lowest percentage was related to the availability of a queue management system or waiting chair for older individuals [Table 1].

**Table 1.** Outdoor buildings and offices in Kashan based on age-friendly city indicators

Items	Yes, N(%)	No, N(%)
Are the stairs fenced?	16(80)	4(20)
Is the stair height appropriate?	13(65)	7(35)
Is there a standard wheelchair ramp next to the stairs?	7(35)	13(65)
Is the corridor flooring slip-resistant?	13(65)	7(35)
Is there an elevator in the multi-story building?	5(25)	15(75)
Are the signboards in the building large, legible, and visible?	16(80)	4(20)
Is there a standard sanitary facility for the older people?	5(25)	15(75)
Are the office chairs at the right height?	15(75)	5(25)
Is there a chair for customers in front of each employee's desk?	11(55)	9(45)
Does the building have the same level as the sidewalk?	6(30)	14(70)
Is there a queue system for older people?	0(0)	20(100)
Are the building doors wheelchair-accessible?	13(65)	7(35)
Are there enough waiting chairs in the building?	7(35)	13(65)
Are there waiting chairs suitable for older people?	0(0)	20(100)
Is there a public prayer room?	20(100)	0(0)
Are there prayer tables for older people in the prayer room?	3(15)	17(75)
Can people in wheelchairs easily enter the prayer room?	2(10)	18(90)
Is the lighting in the environment appropriate?	12(60)	8(40)
Is the overall cleanliness of the environment satisfactory?	14(70)	6(30)
Is there a designated parking area for older and disabled individuals?	1(5)	19(95)

N: Number, (%): Percent

Urban roads and transportation received a score of 6.10  $\pm$  2.34 out of 20 (range 5-10, 95% CI: 5.8-7.0), indicating average age-friendly indicators. The highest percentage was achieved in terms of the overall cleanliness of the environment. However, no scores were given for the

presence of escalators on pedestrian bridges, wheelchair accessibility on pedestrian bridges, availability of public sanitary facilities suitable for older individuals in high-traffic areas, and the presence of special public vehicles for older and disabled individuals [Table 2]

**Table 2.** Urban roads and transportation in Kashan based on age-friendly indicators

Items	Yes, N(%)	No, N(%)
Are there bridges every 50 to 100 meters over creeks that are accessible for older people using wheelchairs?	8(40)	12(60)
Can wheelchair users and stooped older people access ATMs?	2(10)	18(90)
Do pedestrian bridges have escalators?	0(0)	20(100)
Can individuals in wheelchairs cross pedestrian bridges?	0(0)	20(100)
Are obstacles and curbs at a height that allows easy passage for older people?	11(55)	9(45)
Do the sidewalks have safe and suitable flooring?	11(55)	9(45)
Are the sidewalks at least 1.5 meters wide?	11(55)	9(45)
Are the sidewalks slip-resistant during snow and rain?	9(45)	11(55)
Are there appropriate chairs for older people to rest on sidewalks?	3(15)	17(85)
Are there sanitary facilities for older people in high-traffic areas?	0(0)	20(100)
Are there trash cans of suitable height every 30 meters?	12(60)	8(40)
Is the general lighting in the environment appropriate?	12(60)	8(40)
Is the overall cleanliness satisfactory?	14(70)	6(30)
Are there designated parking spots for older people and wheelchair users on every street (at least every 200 meters)?	1(5)	19(95)
Are there public vehicles specifically designed for older and disabled people?	0(0)	20(100)
Do public vehicles stop at special stations that are on the same level as the vehicle?	4(20)	16(80)
Are there covered areas for older people at public transportation stations?	7(35)	13(65)
Are there comfortable and safe seats for older people at public transportation stations?	8(40)	12(60)
Are pedestrian traffic lights timed appropriately for older people using mobility aids?	5(25)	15(75)
Are the connections between sidewalks and main roads suitable for wheelchairs?	4(20)	16(80)

N: Number, (%): Percent

Parks and public spaces received a score of  $7.57 \pm 1.5$  out of 16 (range 6-11, 95% CI: 6.8–8.1), demonstrating average age-friendly indicators. The highest percentage was related to the appropriate height of benches and the suitability of park sidewalks with wheelchair dimensions and sizes. However, no scores were given for the presence of special sports equipment for older individuals, a designated gathering space for older people, safe flooring for older individuals, suitable sanitary facilities in the park for older individuals, and a designated parking area for older and disabled individuals [Table 3].

Religious places received a score of  $10.09 \pm 2.6$  out of 12 (range 7-11, 95% CI: 9.2–10.3), indicating good age-friendly indicators. The highest percentage was attributed to the presence of a prayer table for older individuals, while the lowest percentage was due to the absence of parking and lack of safe flooring for older individuals [Table 4]. Unsafe flooring in mosques and religious places was associated with multiple carpets stacked on top of each other and raised edges on the carpet, increasing the risk of falls for older individuals.

**Table 3.** Parks and public spaces in Kashan based on age-friendly indicators

Items	Yes, N(%)	No, N(%)
Are there sports equipment specifically designed for the older people in the park?	0(0)	20(100)
Is there a designated space for the older people to gather in the park?	0(0)	20(100)
Are the park floors safe for older people to walk on?	0(0)	20(100)
Are there enough benches in the park, with a maximum distance of 30 meters between benches?	11(55)	9(45)
Do the benches have a suitable height, with a distance of 40-50 cm between the seat and the ground?	16(80)	4(20)
Is there a prayer room in the park?	7(35)	13(65)
Are the park sidewalks wide enough and proportional to wheelchair dimensions?	15(80)	5(20)
Is the walking surface of the park at the same height as the grass surface?	11(55)	9(45)
Is there a standard and accessible sanitary facility for older people within a walking distance of 500 meters or less?	0(0)	20(100)
Are the stairs in the park at a suitable height?	12(60)	8(40)
Are there trash cans of appropriate height available every 30 meters in the park?	18(90)	2(10)
Is the sidewalk separated from the bike path in the park?	2(10)	18(90)
Is there a designated parking area for older and disabled people in the park?	0(0)	20(100)
Is there a standard wheelchair ramp next to the stairs in the park?	3(15)	17(85)
Is the general lighting in the environment appropriate?	14(70)	6(30)
Is the overall cleanliness of the environment satisfactory?	13(65)	7(35)

N: Number, (%): Percent

**Table 4.** Religious places in Kashan based on age-friendly indicators

Items	Yes, N(%)	No, N(%)
Is the building on the same level as the sidewalk?	12(60)	8(40)
Are there fences around the stairs of the building?	8(40)	12(60)
Are the stairs in the building at a suitable height?	13(65)	7(35)
Is there a standard wheelchair ramp next to the stairs?	6(30)	14(70)
Are there standard sanitary facilities for older people?	6(30)	14(70)
Is there a suitable ablution for older people?	8(40)	12(60)
Is there a prayer book with large and legible font for older people?	8(40)	12(60)
Is the building flooring safe?	3(15)	17(85)
Is there a designated prayer table for older people?	20(100)	0(0)
Is there a designated parking area for older and disabled people?	0(0)	20(100)
Is the general lighting in the environment appropriate?	19(95)	1(5)
Is the overall cleanliness of the environment satisfactory?	18(90)	2(10)

N: Number, (%): Percent

## Discussion

The findings of the present study indicate that outdoor buildings and offices, urban roads and transportation, parks and public spaces, and religious places in Kashan received varying ratings based on age-friendly indicators.

Regarding outdoor buildings and offices, it was noted that while the presence of a public prayer room received a high score, areas such as the lack of a queue system and waiting chairs for older individuals were identified as shortcomings. These deficiencies could potentially create discomfort for older individuals with musculoskeletal issues. In terms of urban roads and transportation, the cleanliness of the environment received the highest rating, which could positively impact the social engagement of older adults. However, challenges were observed for older adults and wheelchair-dependent seniors due to the absence of escalators on pedestrian bridges, inadequate public sanitary facilities, and the lack of specialized public transportation for older and disabled individuals. These inadequacies may contribute to feelings of insecurity and discomfort among older adults, particularly those with disabilities.

A study conducted in Yazd highlighted that movement restrictions caused by obstacles represent a major challenge for the elderly.<sup>[21]</sup> Similarly, research in Sweden indicated that approximately 60% of falls among older adults occur on pedestrian pathways.<sup>[22]</sup> Moreover, a study in Singapore identified environmental factors, such as uneven and obstructed footpaths, inadequate shelter or shade, insufficient ambient lighting for reading signs and navigating, and a scarcity of footbridges suitable for the elderly, as contributors to the unsafe outdoor environment for older individuals, consequently reducing their mobility outdoors.<sup>[23]</sup>

In the current study, parks and public spaces were found to have the highest scores for the appropriate height of benches and the suitability of park sidewalks for wheelchair dimensions. However, these areas were deemed insufficiently age-friendly due to the lack of sports equipment, adequate gathering spaces, safe flooring, suitable sanitary facilities, and dedicated parking areas for older individuals. Walking in unsafe green spaces, such as insecure parks, can pose significant risks, especially for older adults.<sup>[24]</sup>

Research conducted in Mashhad highlighted the absence of sports facilities for older individuals as a major concern among participants in that age group.<sup>[13]</sup> Additionally, a study in China identified a direct correlation between age-appropriate living environments and physical activity levels in older adults, particularly those with lower

functional capacities.<sup>[25]</sup> Older individuals, who may have more free time due to factors like loneliness and reduced employment commitments, often turn to sports and recreational spaces, including parks, as ideal locations to engage in physical activities. This engagement can have positive effects on their cognitive, physical, and mental well-being, ultimately promoting successful aging.<sup>[26,27]</sup>

Enhancing the age-friendliness of parks and public spaces by addressing the identified shortcomings can play a crucial role in supporting the overall health and well-being of older populations. By providing suitable amenities and creating safe environments, communities can encourage older individuals to stay active, socialize, and enjoy a higher quality of life as they age.

In the current study, religious places received the highest scores for the presence of prayer tables designed for older individuals. However, these places still exhibited shortcomings and were not entirely age-friendly due to the lack of parking areas for older and disabled individuals and unsafe flooring. Given the religious nature of Kashan, it is essential to ensure that religious places are conducive to the physical needs of older people. A study conducted in Yazd revealed that older individuals dedicate a significant amount of their free time to religious activities, particularly prayer.<sup>[28]</sup> The availability of designated prayer tables for older individuals with musculoskeletal issues can facilitate their participation in these activities. Nevertheless, unsafe flooring increases the risk of falls among older individuals. Research has shown that uneven floors, inadequate railings, and grab bars can contribute to a higher risk of falls in older populations.<sup>[29]</sup>

Overall, religious places in Kashan were found to be in better condition compared to other locations examined in this study. This improvement is likely attributed to the voluntary contributions of individuals and endowments made to these places, which have enhanced their conditions relative to other sites. However, these places still do not fully cater to the needs of older individuals and may pose risks for falls among the elderly. According to the CDC, falls and accidents are leading causes of death in older adults, with approximately three million seniors being admitted to emergency rooms each year due to falls.<sup>[24]</sup> In Iran, 20-28% of older adults have experienced falls.<sup>[30]</sup> Unsafe commuting environments can have detrimental consequences for older adults, as collisions with vehicles and being in unsafe places are common causes of falls among this demographic.<sup>[22]</sup>

One strength of this study is the unbiased observational assessment of age-friendly indicators based on established standards. Advanced countries that have implemented

age-friendly initiatives can serve as models for other nations.<sup>[31]</sup> Given Kashan's rapidly aging population and its appeal to tourists due to its rich historical heritage spanning seven thousand years, it is imperative for officials and policymakers to address existing deficiencies and promote Kashan as an age-friendly city.

This study focused on a limited number of indicators related to an age-friendly city. As researcher-developed tools were utilized in this study, direct comparisons with results from other studies may not be exact. Future research could explore additional indicators to provide a more comprehensive evaluation of Kashan's age-friendliness.

## Conclusions

In terms of outdoor buildings and offices, urban roads and transportation, as well as recreational and religious places, Kashan generally falls short of meeting the standards of an age-friendly city. Creating age-friendly environments and ensuring social equity for older individuals present challenges for those involved in elder affairs. To maintain the active engagement of older adults, it is crucial to first establish a physical environment that is accommodating and secure for this demographic so they can participate in social activities like other age groups. The findings from this study can guide policymakers in the field of aging to address deficiencies and leverage strengths in promoting a healthy and engaged older population with an enhanced quality of life.

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## Competing interests

The authors declare that they have no competing interests.

## Abbreviations

Confidence interval: CI;

The content validity index: CVI;

Content validity ratio: CVR;

Centers for Disease Control: CDC;

World Health Organization: WHO.

## Authors' contributions

All authors read and approved the final manuscript. All authors take responsibility for the integrity of the data and the accuracy of the data analysis.

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## Availability of data and materials

The data used in this study are available from the corresponding author on request.

## Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki. The study was approved by the ethics committee of Kashan University of Medical Sciences (Code: IR.KAUMS.REC.1396.53). To maintain confidentiality, codes were used instead of the names of the observed locations.

## Consent for publication

By submitting this document, the authors declare their consent for the final accepted version of the manuscript to be considered for publication.

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