

Assessing the Suitability of the Design, Safety and Physical Environment of Hospitals for the Elderly: A Case Study in Iran

Ahmad Ahmadi Teymurlouy*¹, Hesam Seyedin², Reza Fadaye-Vatan³, Amir Omrani⁴

1) ^a Health Management and Economics Research Center, Iran University of Medical Sciences. ^bDepartment of Pharmacoconomics & management, School of Pharmacy- International campus, Iran University of Medical Sciences, Tehran, Iran.

2) Department of Health in Disasters and Emergencies, School of Health Management and Information sciences, Iran University of Medical Sciences, Tehran, Iran

3) Center for Ageing Research, University of Social Welfare and Rehabilitation, Tehran, Iran.

4) School of Management and Medical Information, Iran University of Medical Sciences, Tehran, Iran

*Author for Correspondence: Ahmadi.sa@iums.ac.ir

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ABSTRACT

Iran, like many other countries, is experiencing a growing elderly population. In 2016 census in Iran, out of a population of 79,926,270 people, more than 6 million people (8.2% of the population) were 60 years and over. This can be a major challenge for both healthcare providers and senior patients. This study assesses the suitability of the design, safety, physical environment and systems of Iranian hospitals based on age-friendly design principles.

In this descriptive research, 26 hospitals in Tehran were selected and examined. Data were collected using a valid and reliable checklist with 50 items assessing the physical environment, accessibility, service delivery, and management systems of the hospitals.

The results showed that 96 % of hospitals have wide corridors, 88% have suitable lighting, 85% have ramps for wheelchair users and railings for staircases, but 58% do not have an alarm in each toilet. It can be said that the majority of the hospitals were in a relatively good condition in terms of safety of the physical environment, but resource management and special programs and healthcare systems for the elderly were in a poor condition.

Given the rising elderly population in developing countries such as Iran, it is imperative to create elder-friendly environments and programs. The increasing demand for hospital beds necessitates special care be given to elder-friendly principles in the design and construction of new hospitals as well as the renewal of existing ones. It is also vital to carefully consider the health, safety and special needs of older patients in design and construction of new hospitals as well as the renewal of existing ones and developing health policies at the macro, meso and micro level, especially as they relate to inpatient and outpatient services.

Key Words: Elder-Friendly Hospitals, Safety, Elder-Friendly Principles, Physical Environment of Hospitals, Healthcare Services.

INTRODUCTION

Advances in living conditions, increasing longevity, and rising life expectancy have created the worldwide phenomenon of ageing [1]. This puts great economic and social demands on countries in the 21st century [2]. The growing ageing population is a major challenge for both healthcare providers and patients [3]. The United Nations considers the benchmark of 60 years and over as old age, even though in advanced countries 65 years and over is used to refer to old people [4-6].

Providing healthcare to the elderly has always been of interest to policymakers in the World Health Organization (WHO). Since the United Nations World Assembly on Aging in 1982, the issue of healthcare for the elderly and their needs became a top priority for

many healthcare systems around the world [7, 8]. In a report, WHO argued that the ageing population is growing at a faster rate in developing countries, with Iran, Cuba, and Mongolia undergoing the largest growth. Therefore, one of the key issues in international policies on seniors' health has been to require countries to provide primary healthcare to the elderly and promote elder-friendly hospitals [9-11].

In a national census in 2016 in Iran, out of a population of 79,926,270 people, more than 6 million people (8.2% of the population) were 60 years and over. Table 1 shows demographic changes in the ageing population of Iran in the last few decades. An upward trend can be seen in the last four decades, which is due to advances in primary healthcare. The elderly population of Iran is expected to increase to 25% by

2050 due to the high number of childbirths in the 1980s [16].

Table 1: Demographic changes in Iran's ageing population over the last few decades

Year	1976	1996	2006	2016	2050
People over 60 years	1,770,614	2,595,181	5,121,043	6,159,676	25,900,000

Given the high costs of healthcare for seniors and the longer length of stay for these patients [13], Iran's health system must prepare for the increasing demand for healthcare among this portion of the population, especially inpatient and outpatient care for elderly patients with such chronic diseases as dementia, falls, urinary incontinence, and masked depression [14]. On the other hand, the number of older patients visiting hospitals and the prevalence of chronic diseases in old age forces substantial costs on the country's healthcare system. This includes creating infrastructure for healthcare providers that is friendly to the needs of the elderly.

Due to the growing ageing population of the world, WHO has been increasingly promoting elder-friendly and safe environments, including elder-friendly cities, hospitals, and communities. Elder-friendly hospitals have special structure and design to be safe places for older clients and sensitize and educate healthcare providers about their specific needs. The structure of these hospitals makes physical access easier for older persons who may have mobility, vision or hearing impairments and adapt their primary healthcare management systems to the needs of older persons. Creating the physical environment that fosters the safety and participation of older people, having accommodating visit and admission schedules, and having appropriate signs, toilets, inpatient care, admission procedures, and payment systems are other critical aspects of an elder-friendly hospital [15, 17]. WHO has specified three major principles for elder-friendly hospitals:

1. **Information, Education, Communication and Training**, including staff training in clinical geriatrics and approaches to patient education;
2. **Healthcare Management Systems**, i.e. adapting procedures, such as registration, to the special needs of older persons and supporting continuity of care through updated medical records available at each visit;
3. **The Physical Environment**, i.e. clean, safe and comfortable centres that apply, as far as possible, the principles of Universal Design [14].

In 2008, WHO published the Age-friendly Primary Health Care Centers Toolkit to highlight its commitment to promoting healthcare services for seniors. Its objectives were as follows:

- Improving the primary healthcare response for older persons.
- Sensitizing and educating primary healthcare workers about the specific needs of their older clients.
- Assisting primary health workers in how to operate the geriatric care instruments/tools contained in the toolkit.
- Raising awareness of the accumulation of minor and major disabilities experienced by older people to primary health workers.
- Providing guidance on how to make primary health care management procedures more responsive to the needs of older people.
- Providing guidance on how to do environmental audits to test primary health care centres for their age-friendliness [11].

WHO has used this toolkit to promote age-friendly hospitals and healthcare centres as well as PHC management systems. Development of this toolkit involved background research in primary healthcare models, with an emphasis on the strengths and weaknesses in staff skills and knowledge, the organizational structure of primary healthcare centres, and common practices. Focus groups were then conducted in six countries—Australia, Canada, Costa Rica, Jamaica, Malaysia, and the Philippines—which included older people and their healthcare providers. These focus groups explored barriers to care, current patterns and insights into what older people want from primary health care providers and centres, what practitioners think are the issues, and problems of primary health care for older people [13].

MATERIALS AND METHODS

This is a descriptive study on the age-friendliness of general hospitals in Tehran based on the principles specified by the WHO and 2014 data. These hospitals were affiliated with the University of Medical Sciences located in Tehran. Data were collected using a 50-item checklist. This checklist provided questions that allow evaluation of hospital management system, of counselling services provision, of accessibility and safety, and of user-friendliness. To develop this checklist, the Age-friendly Health Care Centers Toolkit published by WHO [13] and the checklist of Rashmi *et al.* [12] were translated and localized by experts. Translation accuracy was checked through back translation. The content validity of the checklist was examined by seven experts and their comments

were taken into consideration [15]. The final checklist had 50 items in three areas: Information, Education, Communication and Training; Healthcare Management Systems; and the Physical Environment.

Due to limitations on time and budget, convenience sampling was used to select and study the condition of healthcare services to the seniors. Sample hospitals were supervised by the Ministry of Health and were affiliated with Tehran University of Medical Sciences, Shahid Beheshti University of Medical Sciences and Iran University of Medical Sciences. This sample from the most populated city of Iran can provide useful data for age-friendliness of Iranian hospitals. There are no specialized geriatric hospitals in Tehran, and the hospitals examined in this study are general hospitals that provide healthcare services to the elderly. There are 50 public hospitals in Tehran, of which 22 specialized in paediatrics, obstetrics, and gynaecology, and psychiatry and the rest were general hospitals. 2 general hospitals refused to participate in

this research, and overall 26 hospitals were selected and examined.

Data were collected through direct observation and structured interviews with managers and healthcare providers and recipients. Data were refined and analyzed in SPSS. The checklist was rated on a 3-point scale (Yes, No) and was reported in the form of tables and graphs.

RESULTS

An important feature of age-friendly hospitals is easy, safe and quick access to the hospital. Table 2 shows that none of the studied hospitals provided easy access and did not have a dedicated parking lot for the elderly. However, more than 80 percent of the hospitals were near a bus stop or subway station. Moreover, only one hospital had a separate entrance for the elderly.

Table 3 shows that there are no geriatric wards in these hospitals, and there is not a system of priority for seniors.

Table 2: Accessibility to the hospitals

Subscale	Items	Yes		No		To some extent	
		F	%	F	%	F	%
Accessibility	Is there a dedicated parking lot for seniors near the main entrance?	0	0	26	100	0	0
	Is the hospital located near a bus stop/subway station?	21	81	5	15	1	4
	Is there a separate entrance for seniors?	1	4	25	96	0	0

Table 3: Providing special services at the hospital

Subscale	Items	Yes		No		To some extent	
		F	%	F	%	F	%
Health promotion and healthcare services	There is a separate multi-speciality clinic for seniors.	1	4	25	96	1	4
	There is a system of priority for seniors in pharmacy to collect drugs.	2	8	18	69	6	23
	There are volunteers to guide seniors through different sections of the hospital.	1	4	18	69	7	27
	There a system of priority for seniors in all the sections of the hospital.	0	0	26	100	0	0
	Seniors are explained about the prescribed drugs at the pharmacy.	7	27	12	46	7	27
	There is a separate queue for seniors at all counters.	0	0	26	100	0	0
	There is a patient care coordinator for seniors.	0	0	26	100	0	0
Inpatient care	There is a separate geriatric ward in the hospital.	0	0	26	100	0	0
	There is entertainment for seniors.	5	19	13	50	8	31
	There is a prayer hall.	14	54	8	31	4	15

Table 4 shows that 88 percent of the hospitals had good lighting. 100 percent of the hospitals had wide doors and rooms, with elevators available to every floor of the hospital. 85 percent of the hospitals had ramps for wheelchair users and railings for staircases. 50 percent of the hospitals have telephone booths on every floor and in important areas of the hospital.

In 92 percent of the hospitals, toilets were available on every floor. In 58 percent of the hospitals, toilet doors did not open both ways. Finally, more than half of the hospitals did not provide alarms in toilets, but most of them had grab bars in every toilet.

Table 5 shows that 88 percent of the hospitals had signs in all areas. However, only 38 percent of the

hospitals displayed signs in the local language. 81 percent of the hospitals displayed signs in big letters.

Table 4: Safety of Physical environment of the hospitals

Subscale	Items	Yes		No		To some extent	
		F	%	F	%	F	%
Physical environment	Telephone booths are available in all the important areas of the hospital.	5	19	12	46	9	35
	There is good lighting in the hospital.	23	88	1	4	2	8
	The doors are wide.	25	96	0	0	1	4
	There are elevators available to seniors to every floor of the hospital.	20	77	3	12	3	12
	Elevators, corridors, and doors are wide and spacious.	22	85	1	0	3	12
	The physical environment is not complex and access to different departments is easy for seniors.	14	54	4	15	8	31
	Hospital floor is not slippery.	20	77	2	8	4	15
Toilets	There are ramps for wheelchair users and railings for staircases.	22	85	0	0	4	15
	Toilets are available in all important areas of the hospital—outpatient department, inpatient department, and every floor.	17	65	2	8	7	27
	There is an alarm in each toilet.	8	31	15	58	3	12
	The toilets floors are not slippery/clean and dry.	19	73	5	19	2	8
	There are grab bars in the toilets.	18	69	6	23	2	8
	There is a flush toilet available.	11	42	8	31	7	27
	There is an escort available to help seniors when they use the toilet.	6	23	12	46	8	31
Toilets have doors which open both ways.	6	23	15	58	5	19	

Table 5: Guiding signs for patients in the hospitals

Subscale	Items	Yes		No		To some extent	
		F	%	F	%	F	%
Signage	Signs are put up in all important areas of the hospital—outpatient department, inpatient department, and every floor.	23	88	1	4	2	8
	Big letters are used on each sign.	21	81	0	0	5	19
	Signs are also displayed in the local language.	10	38	16	62	0	0

DISCUSSION

Elder-friendly hospitals have special structure and design for older clients and sensitize and educate healthcare providers about their specific needs. These hospitals adapt their primary healthcare management systems to the needs of older individuals and make physical access easier for those who may have mobility, vision or hearing impairments. These hospitals have been strongly recommended by WHO due to the growing ageing population and the increasing healthcare demands of older patients [16]. Creating the physical environment that fosters the health, safety and participation of older people, having accommodating visit and admission schedules, and having appropriate signs, toilets, inpatient care, admission procedures, and payment systems are other critical aspects of an elder-friendly hospital [15, 17].

The Regional Geriatric Program of Toronto has made the promotion of elder-friendly hospitals a top priority on its agenda. This initiative focuses on five areas: organizational support, processes of care, emotional and behavioural environment, and the physical environment [18, 19].

Accessibility

Easy access to hospitals through public transportation is an important component of an elder-friendly hospital, as many senior citizens may not be able to use a personal vehicle or be accompanied to the hospital. Easy access is especially important for seniors who need to repeated follow-ups. This component was underlined in Rashmi *et al.*, who examined the hospitals in Bangalore City [15]. Another study underlined components such as special parking spaces for the elderly, a separate entrance, and the nearness of a bus stop/subway station [20]. A study in Saudi Arabia reported issues of access of older adults to primary healthcare centers through lack of public transport, limited parking opportunities, the presence of steps, ramps, and internal stairs, and the lack of handrails [25].

The hospitals studied in this research had relatively good access to public transportation. However, there were no dedicated parking lots and no separate entrance for seniors that may cause some problem for the safety of the elder population. Although, there seems to be no need for a separate entrance as older clients can use the same entrance as others, but having ramps and railings are essential to their safety and well-being. It is also necessary to have a dedicated

parking lot for disabled or older patients that is near the main entrance.

Physical Environment

The safety of the physical environment is one of the hospitals most crucial aspects and must accommodate the needs of senior citizens. This Research shows that most hospitals are not ideally designed for providing the best care to older patients [13]. The physical environment of the hospital is often considered to be the main focus of the Senior Friendly Hospital (SFH) movement in Canada. The goal of these hospitals is to decline the risks of hospitalization with the aim of lessening the loss of function, keeping physical independence, and being more responsive to the growing needs of seniors [26]. A study was conducted on senior-friendly emergency department care in Ontario, Canada, using a 'senior-friendly' conceptual framework that included the physical environment, social climate, hospital policies and procedures, and wider health care system. The results indicated problems with the physical space of the ED, including overcrowding, noise, and limited space. There were also problems revolving around promoting safe and independent function, and having appropriate equipment and furniture for safety, comfort, and ease of work. Moreover, orientation and wayfinding cues, and access to the ED (e.g. parking, bus stop) and amenities (e.g. bathrooms, walk-ways and distance to other areas) presented challenges [23].

Good lighting, wide doors, spacious elevators and corridors, communication tools are other important components of an elder-friendly hospital [15]. Regional Geriatric Program of Toronto has focused on modifying the physical environment (dementia specific environments, elevators, hallways, doorways, lighting, signage, etc.) for providing elder-friendly healthcare services [19]. Woo *et al.* argued that the glass barrier surrounding the member of staff at admission and information counters actually represent a physical barrier to communication [22].

It is obvious that the older adults are at greater risk for disability and poor health and the studies about healthy ageing highlights the important role of supportive, barrier-free settings of the environment of hospitals particularly for them. The physical environment of hospitals is the main component should be designed and reconstructed elderly person-centered [27].

In this study, more than 50 percent of hospitals provided telephone booths for seniors in all important areas of the hospital and on every floor, and most hospitals had good lighting. However, the ease of using these facilities remains a challenge. On the other hand, all the hospitals had wide doors and spacious rooms, and elevators were available to seniors to all the floors of the hospital. All the hospitals except for one case had wide and spacious elevators, corridors,

and doors, allowing for free and easy movement of seniors. More than 80 percent of the hospitals had a simple environment, with easy access for seniors to different departments. Almost all the hospitals had ramps for wheelchair users and railings for staircases. Woo *et al.* emphasized on the need of more space and seats for rest of older patients especially in the emergency department [22] and this should be studied in future researches in this domain [27].

In 92 percent of the hospitals, toilets were available on every floor and in all the important areas of the hospital, including inpatient and outpatient departments. However, access with a wheelchair was difficult. Almost 70 percent of the hospitals provided flush toilets in addition to traditional ones, but in almost 60 percent of the hospitals, toilet doors did not open both ways, which can threaten the health and safety of older patients in critical situations. Having an alarm in toilets is crucial for the well-being of seniors. Our study showed that more than half of the hospitals lacked toilet alarms, but did provide grab bars. Grab bars are important for both elderly and disabled patients and their absence in some hospitals requires serious attention. Some hospitals provided volunteers to escort seniors to the toilet. In almost all the hospitals, toilets were non-slippery, dry and clean.

Signage plays a significant role in guiding patients and families to different departments and units of the hospital. Placement, lettering, and clarity of signs are very important for older patients with visual impairment. Signs must also be provided in local language [16]. PHC workers must be identified using name badges and name boards, which should be in large letters and over contrasting background [13]. Woo *et al.* found that signage may be inadequate for the visually impaired or the illiterate, and that additional use of picture symbols may be considered, and that more people such as volunteers are needed to help with directions [22]. Our study showed that almost all the hospitals had proper signage in outpatient and inpatient departments and on every floor. Signs are especially important for older patients who are not yet familiar with the hospital, and this effect can diminish after several visits to the place.

Healthcare Services

Having the proper PHC system and a safe physical environment is crucial to elder-friendly healthcare services and inpatient/outpatient care [11]. A study showed that having a separate admission process, OPD, counters, and queues for senior citizens as well as a special admission schedule [17]. Our study showed that only some hospitals provided measures for guiding and facilitating the admission of older patients who do not have the capability to stand in long queues and go through tiresome admission processes. The results also showed that none of the hospitals had

a system of priority, no separate queue/counter, and no dedicated admission process for seniors.

There was a serious shortcoming in in-home care for older patients – that can make a safer place for patients - and a lack of a patient care coordinator in the studied hospitals. Only one hospital had a geriatric physician and the lack of specialists in this area was alarming. Of course, this is a common challenge in most developing countries [21], and health policymakers must develop and implement plans to solve this problem. Our findings showed that none of the hospitals had a special care ward or unit for seniors and most hospitals did not provide special healthcare services for these patients. Only one hospital had a multi-speciality clinic that provided outpatient care to seniors (two days a week). Overall, in almost all of the studied hospitals, inpatient, and outpatient care was provided to seniors the same way as other demographic groups.

In terms of human resource management in the health sector for the elderly population, studies have shown that educating healthcare workers about the specific needs and safety of their older clients is a key component of an elder-friendly hospital. Experts believe that many healthcare workers view ageing through a negative lens and as a disease. To correct this misconception, healthcare workers, including physicians, nurses, and non-medical staff, must be sensitized and educated about this issue [16]. Woo *et al.* argue that teaching effective communication skills to healthcare staff improves their patience with older patients [22]. Research conducted in Canada shows that effective communication with seniors takes more time and their complex medical conditions must be met with greater care [23]. One study in Isfahan showed that older patients were least satisfied with the treatment and communications of healthcare workers with them [24].

Social participation for older adults is a key component of overall health and well-being of them and the impact of the environment on social participation, is also a key factor in this regards and must not be overlooked in the design of hospitals, yet older people with visual, hearing or motion deficiencies may be unable to use the services of it because of environmental barriers [27].

Most of the hospitals studied in this research, nurses and staff had not been trained for effective communication with the elderly. The results also showed that no measures had been taken to educate medical and non-medical staff about the needs of older patients and their common health problems like fragility. They also had no training for providing preventive advice to seniors.

Limitations of the Study

There were some limitations in this study, including lack of cooperation by some hospital managers in data collection, which led to these hospitals being removed from sampling. Moreover, budget limitations prevented us from investigating private hospitals in Tehran. For the same reasons and geographical distribution of cities, it was impossible to investigate hospitals across the country. However, Tehran is the most populated city of Iran with the highest number of hospitals, thus providing a good sample.

Present findings can be helpful in developing national and local policies and plans that aim to reform hospitals and prepare for the growing ageing population of the country. These findings can also accelerate the development of operational programs for educating hospital workers about the specific needs of older patients. Moreover, this study can provide a useful framework for experts in hospital standards especially health, safety and environment of the hospital by which to assess the age-friendliness of hospitals and pave the way for the establishment of elder-friendly hospitals and healthcare departments.

CONCLUSION

Moving toward safe elder-friendly hospitals and getting prepared for the challenges of growing ageing populations are important short-term strategies for the health system in developing countries. These countries must act quickly to develop and implement proper policies for facing the challenges arising from the growth in their ageing population.

One of the most important policies and programs in this regard is to design and build hospitals based on age-friendly principles that aim to (1) sensitize and educate healthcare workers about seniors and their unique problems, (2) create healthcare management systems that facilitate processes and procedures for older patients, and (3) designing the safe physical environment based on universally recognized elder-friendly principles. Meanwhile, it is necessary to apply such principles in renovating existing hospitals. Establishing a geriatric ward in public hospitals is another significant measure for improving the status quo. These strategies not only address the current demands of healthcare for the elderly population of Iran (which constitutes 8 percent of the total population) but can also prepare the grounds for design and construction of elder-friendly hospitals as well as specialized geriatric units and long-term care centres.

ETHICAL ISSUES

Ethical issues have been considered by the authors and original study had the permission of the ethical committee of research of the university.

CONFLICT OF INTERESTS

There are no conflicts of interest in this research.

AUTHORS' CONTRIBUTIONS

Ahmad Ahmadi had the main idea of this study and has done the literature review and design the framework of the study. Hesam Seyedin guided the study and Reza Fadaye Vatan gave fruitfully advises in the field of ageing and elderly. Amir Omrani helped us in gathering and analyzing the data in this research.

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