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Examining the age-friendly urban parks' criterions of Sari-Iran

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ABSTRACT

Parallel to aging growth, urbanism development and inefficiency of the urban spaces for the aged the World Health Organization (WHO) declared the age-friendly city concept at 2005, according which hundreds of cities have organized or are revitalizing. At the same scope and because of urban parks importance as one of the urban spaces desirability, this study is done by the purpose of examining age-friendly urban parks criterions in Sari-the capital of a northern province in Iran with an aging rate of more than the whole country-. According to the goal, this research is a review-comparative. The study emphasizes on 3 main parameters of safety-security& clean environment in age-friendly urban parks the same as the age-friendly cities. According to the proposed checklist Sari's urban parks are 35% age-friendly and best at environmental sanitation while worst at safety.

Key words: ageing changes, age-friendly parks, aged& open spaces

INTRODUCTION

Parallel to changes such as lifetime growth, improvement of healing services and human knowledge, birth rate reduction and population controlling plans, world is aging so quickly, that according to WHO's report about 600 million people in the world are now in groups of 60 and above that means 11% of the whole world population, which according to estimations will reach to 2 billion up to 2050. Anyway the main concern is that these changes are mostly in underdeveloped countries such as Iran which have the least foresight to face such challenges. (In Iran it is estimated that population of those +60 years will grow about 13% from 2012-2050, while no related plan is prepared yet)

Along these changes urbanism rate is also rising. On 2010 more than half of the world's population were city-dwellers which will continue rising especially in underdeveloped countries, so that up to 2030, 3 out of 5 people in these countries will be city-dwellers which will be about 4 fold in comparison with developed countries.

To sum up it is estimated until 2050 the number of aged living in urban areas will become 16 fold in comparison to 1998 and so they will form ¼ of the underdeveloped countries citizens[1] which if enough preparation doesn't speculated, comings will face great challenges. To avoid these challenges and also to use the power of olds as future citizens there should be some changes in urban spaces especially places such as parks which moreover their effective functions, are one of the urban desirability criterions and also one of the aged priorities.

So in most of recent discussions on environment and urban management plans appropriate park design-so that to be also usable for the aged- is one of the necessities.

MATERIALS AND METHODS

This research is a review-comparative study done in 6 month in Sari-the capital of a northern province in Iran which according to last surveys has 3 million population whom 240000 are +60 years and their numbers are also growing by a rate of about 8.3% in comparison to 7.3% on the whole country-, for which firstly WHO's and some developed countries findings on age-friendly issues were reviewed by net surfing and library sources, then aging changes and their effects on individuals' relations with surrounding environment and also the coming expectations were discovered (again by literature review and fuzzy logic), afterward a checklist was produced by mixing these expectations, previous findings and Iran's inner standards of urban design for weak & disabled, and was used to assess urban parks of Sari. Finally results were given in forms of table & charts.

RESULTS

The aged are usually faced with 4 groups of changes:

1. Physiological 2. Psychological 3. Social 4. Economical
- 2.

The main physiological changes which are mostly inevitable are the same as table below:

Table1. The main physiological changes of aging

Target organ	Manifestation
General system	Impaired mobility due to body fat mass and water decrease, obesity & anorexia
Respiratory Sys.	Decreased elasticity and chest stiffness, muscular weakness, dyspnea, increased respiratory rate, inability of respiratory discharge, hyper sensitivity toward infections [2]
Cardiovascular Sys.	Impaired arterial compliance and hypertension, heart failure & cardiac events
Gastrointestinal Sys.	Impaired hepatic function, reduced acid output of the stomach, reduction in colon movement resulting in defecation disturbances
Kidneys	Reduction in urine volume & concentration and increased urinary frequency. other problems like urinary infection and enuresis
Blood & Immune Sys.	Bone marrow depletion, increased auto antibodies level resulting in autoimmune disease [2]
Muscular & Skeletal Sys.	Increased fatty tissue & reduced muscular mass and total body bone density, osteomalacia, functional disorders like muscular stiffness, mobile articular osteoarthritis. fractures & ... [3]
Nervous Sys.	Sleep disturbances, memorial & ...
Senses	Visual weakness, loss of accommodation in different light stimulation, hyper photo sensitivity, hypersensitivity with glare. Disorders with vision, depth and distance reception. Inability of face to face cross seeing. Persbiocopia and other common eyes disorders.
Visual	
Auditory	Recognition disorders of speech and sound producers and increased sensitivity to background voices.
Tastes	Decreased quality and quantity of the tasting sense usually because of tasting cell changes or death and saliva decrease and it's further effects on GI ¹ Sys.
Smell	Decreased quality and quantity of the smelling sense, however with less progression compared with other senses.
Touch	Touch disorders due to decreased blood supply in remote limbs which would be worsen with other limitations like hyper sensation due to thermal stimulations arising from hypo metabolism and also thermoregulation mechanism insufficiencies. [4]

As it was mentioned before all the aging changes will affect the individuals' relations with their surrounding environment, and here are some of these expectations coming by physiological changes:

Table2. physiological expectations of aging

Target organ	Physiological expectations
General system	Requiring a place with movement and slight physical activities possibilities
Respiratory Sys.	Requiring a place with little topography and slope- Clean environment (no pollutants- no allergens-...) and enough standard sitting areas
Cardiovascular Sys.	Requiring a place with little topography and slope- Partially shaded (a good ventilated and cool place especially in hot seasons and hot climates this factor is very important) and also adjacent to emergency and serving services
Gastrointestinal Sys.	Requiring enough and standard W.C
Kidneys	Requiring enough and standard W.C
Blood & Immune Sys.	Requiring a Clean environment- with no allergen plant or material
Muscular & Skeletal Sys.	Requiring a place for slight physical activities (riding a bicycle- walking-...) - with little height differences &

¹ Gastrointestinal System

	graded slopes- Non-slippery surfaces- Standard handrails- Standard ramps& steps- Enough standard sitting areas, furniture and serving services- Rounded corners- Enough-width pathways and finally close landscape and visual elements on the ground
Nervous Sys.	Requiring clear entrances- Organic or organic-geometric pathways(in which from the end of the way is clear from the beginning)- a place without too many secondary pathways while having enough outstanding visual elements
Senses	Requiring a place of enough light(but not dazzling)-No glittering materials-light colors-Clear depth& distance differences-Clear steps& ramps(by obvious colors, signs , texture or ...)and also of audition, textural or ... signs along with the visual ones
Visual	
Auditory	Requiring a place with little or no noise pollution-Magnified objected sounds and visual, textural or ... signs along with the audition ones
Tastes	Not any special expectation, however enough standard water fountains and considering GI system expectations may be helpful enough.
Smell	Requiring to use greater scents as helping signs and auditory, textural or ... signs along with the smelling ones
Touch	Requiring to use materials with high thermal indexes-with severe texture differences and also auditory, visual or ... signs along with the touching ones moreover no sharp pointed or poisonous plants or materials should be used

Psychological changes will also appear in forms of: 1.sadness 2.loneliness 3.depression 4.anxiety 5.feeling of being absurd 6.feeling of being a burden ,Which if not being treated may even end in severe psychological disorders or disease[5], and will cause these expectation: Requiring a place to escape from loneliness& endless silence of home or too much noise of urban spaces(a place for safe social relations moreover quiet and private places), to experience sympathy feeling and to keep fresh, to relax in a virgin and natural place and finally a place to remember past memories.

Moreover retirement, losing the social value, feeling isolated, and dependent (especially monetary dependency) will also occur as the most important social and economical changes which will end in these expectations: Requiring a local meeting place- a place to express their identity and visit and get acquainted with new people and also an access to cheap or free services.

Considering these limitations no comprehensive research on age-friendly park plans has done yet. Actions in Iran only end in some ramps or steps corrections and important actions overseas(in cities such as Philadelphia-Portland-Toronto- ...)are limited to case studies based on WHO's age-friendly city checklist-given on 8 parts- which on outdoor& building part it is the same as below:

- 1- Public areas are clean and pleasant.
- 2- Green spaces and outdoor seating are sufficient in number, well-maintained and safe.
- 3- Pavements are well-maintained, free of obstructions and reserved for pedestrians.
- 4- Pavements are non-slip, are wide enough for wheelchairs and have dropped curbs to road level.
- 5-Pedestrian crossings are sufficient in number and safe for people with different levels and types of disability, with nonslip markings, visual and audio cues and adequate crossing times.
- 6-Drivers give way to pedestrians at intersections and pedestrian crossings.
- 7-Cycle paths are separate from pavements and other pedestrian walkways.
- 8-Services are situated together and are accessible.
- 9- Special customer service arrangements are provided, such as separate queues or service counters for older people.
- 10- Buildings are well-signed outside and inside, with sufficient seating and toilets, accessible elevators, ramps, railings and stairs, and non-slip floors.
- 11- Public toilets outdoors and indoors are sufficient in number, clean, well-maintained and accessible.
- 12-Outdoor safety is promoted by good street lighting, police patrols and community education.

Comparing the above checklist with other actions done on this issue emphasize on 3 parameters of clean environment (that cover the first case of the checklist)-safety(cases 2-11)& security(case12) which will also be helpful in requiring the mentioned expectations.(the first 2parameters in meeting physiological expectations and the last one for other expectations that mostly suggest new usages which usually will be inaccessible unless by ensuring the user about the security of site because all mentioned changes will cause weakness and so a type of insecurity feeling.) To continue studying these parameters in Sari's urban parks cleared that safety is the weakest required criterions of an age-friendly urban park while clean environment is the best.

DISCUSSION AND CONCLUSION

Putting all finding with Iran's inner standards of urban space for weak or disabled individuals together end in cases below which is given by a checklist format to require each of the 3 mentioned parameters in an age-friendly urban park.

A. SAFETY

A.1- Pathways safety parameters

- 1- There isn't any severe topography in park and the inevitable or slight ones (any height differences more than 2.5(cm)) are also adjusted by standard ramps and steps.
- 2- There are some short cuts along with long distances.
- 3- There are enough entrances so they are not crowded.
- 4- There are some entrances on low traffic streets or pathways for seniors.
- 5- There is at least one accessible entrance at the closest distance to the parking zone.
- 6- There is at least one public transportation station close to the park.
- 7- There are separated paths for walking, bicycle, emergency cars
- 8- Junctions are clear with different colors, textures [6]
- 9- There isn't any projection or crack on pathways, and the inevitable ones (such as sewage trap doors) are flattened or designed so that to be vertical to the path.
- 10- Ground covers are of non-slippery, bright colors, non-glazing, fixed and flat materials.
- 11- Friction index on walking pathway should be about 0.5%-0.6%. [7]
- 12- There are no sharp pointed corners.[8]
- 13- There are no sudden changes in height, slope, texture, light and
- 14- The minimum slope of about 1-3% is considered both in length and width. (So there is no problem of water resistance)
- 15- Along with pathways deciduous trees with small leaves or evergreens are used instead of fruit trees.
- 16- There is no dense or sharp pointed plant covers on corners. (So there isn't any blind spot)
- 17- Any projections based on pillars about 70-200(cm) in height doesn't exceed about 30(cm) in width, but those which are on walls doesn't exceed 10(cm) in width.[9]
- 18- Minimum width of a pathway (180 cm) is considered.[9]
- 19- The space of about 2030(mm) above the head is considered; otherwise it is cleared by signs.[9]
- 20- The maximum slope in length and width (orderly 5% and 2%) is considered; otherwise standard ramps & steps are used.
- 22- Steps standards are regarded as below.
 - Minimum width of 1.5(m) for two-way steps, or the optimum of 1.75(m)
 - Step floor width of 30(cm)
 - Maximum step height of 17(cm)
 - Slope of about 1% to the outer side of the step floor for steps in open spaces, to prevent water resistance
 - Rounded edges
 - Using signs 0.5-1 meter to steps [7]
 - Using light colors on the edges
 - An open space nearby steps(to knock the can to find the steps) [7]
 - Allotting at least 90(cm) of width to ramps [9]
 - Considering this formulation:
 $2r+g=63$ 63: height of handrail (cm) g: steps floor width(cm) r: height of steps(cm) [10]
- 23- Ramps standards are regarded as below.
 - Maximum slope of about 6% in length.
 - No slope in width
 - Maximum length of 77(cm) (for those longer than 77(cm) resting area and enough turning space is required.)
 - Minimum width of 90(cm) (which in crowded and two-way ramps it may even reach to 307(cm))
 - In ramps more than 3meters length for each 1 meter additional, about 5(cm) should be added to its length and 5% will decrease of slope.
- 24- There are kerbs of about 5(cm) between pathways and flowerbeds.[9]
- 25- The surface for wheelchairs to rotate 90° (about 140*140 cm²), 180°(about 140*180 cm²) and 360°(about 150*170 cm²) in all pathways are required.[10]
- 26- All the pathways are protected from inappropriate conditions and they have both sunshine & shading.
- 27- There are resting areas on long distances.
- 28- There aren't severe shading and lighting (which may cause imaginary height difference).

- 29- There are both shaded and sunny areas.[8]
- 30- There are criterion elements along the user's sight (downward).
- 31- There is enough but not too much variation in pathways.
- 32- All lights directions are downward.[7]
- 33- Plant design is done according to the master plan. (to help way finding and not blocking the sight)

A.2- spaces safety parameters

Here are parks' main spaces safety parameters.

A.2.1- W.C safety

- 1- Non slippery floor
- 2- Doors open from the outside
- 3- Whirling doors aren't the only entrances, and in two pair ones at least one pair opens about 815(mm) and turn about 90° [12]
- 4- Where 2 doors are against each other there is at least a space of about 1220(mm) among them.[12]
- 5- Doors open by the maximum power of 22(N).
- 6- Doors thresholds don't exceed 13-19(mm) in height, and they are adjusted by threshold ramps of less than 50% slope.
- 7- Moreover usual W.Cs which are about 85*125(cm²) with doors open outside, there are some for handicapped or disabled seniors which are about 150*170(cm²).
- 8- Urinary bowls standards are regarded as below.
 - About 45(cm) height
 - Having 30(cm) distance from the side door
 - Horizontal handrails(as described on furniture& establishments safety) about 70(cm) above the floor and 20(cm) ahead of the bowl on both sides[11]
 - Vertical handrails about 80-120(cm) above the floor, 30(cm) ahead of the bowl and 40(cm) upper than the bowl[11]
- 9- Washing basins standard is regarded as below.[9]
 - Locating in a space of about 120*75(cm²)
 - Height of 75(cm) at the most
 - About 20(cm) free space beneath
 - Water fountains which are at least 60(cm) far from the edge of the basin
- 10- Additional 30(cm) vertical helping handrails are fixed on the inner part of the door, so that to be about 80(cm) above the floor and 15(cm) ahead of the door joint.
- 11- Mirrors are about 90(cm) above the floor. [9]
- 12- Soap, drier and ... aren't more than 100(cm) above the floor. [11]

A.2.2- Water fountains safety

The below standards are regarded.

- Maximum height of about 1(m), however the fountain itself shouldn't be more than 90(cm) above the floor.[9]

Water fountains basins are about 35(cm) in width and 45-50(cm) in depth.[10]

- They spout water parallel to the fountain
- They can be easily opened and closed
- The fountain is at least 100(mm) (to put a cup beneath easily)
- They have a free space of at least 70(cm) beneath and 120*75(cm²) in front.[11]

A.2.3- Parking safety

- 1- It is close to an entrance.
- 2- Non of parking spaces are less than 2440(mm) in width, 6100(mm) in length, and 2896(mm) in height.[10]
- 3- Along each parking space about 152(mm) in width and 915(mm) in length is added.(for easy movement)
- 4- Steep in all sides aren't more than 2%.

A.2.4- Libraries safety

- 1- At enclosed areas number 3-6 on W.Cs standard and dimensions on pathway standards are considered.
- 2- At least 5% of the furniture is according to the first 2 standards of benches& tables safety.
- 3- At least 5% of shelves are in height of 1220(mm) and width of 915(mm).[9]

A.2.5- restaurants safety

- 1- The first 2 standards of libraries safety are considered.
- 2- A passage of about 915-1065(mm) is considered between fixed tables.[9]

A.2.6- Picnic& Sport fields safety

- All the standards of pathway and furniture are considered wherever needed.
- Different signs for different usages are used.
- All the sport tools have a usage recipe.
- There are some sport experts in active sports fields.
- Active& inactive spaces should be separated.[13]
- There is a diversity of activities.
- They are close to serving services
- Picnic areas especially those for temporary staying are away from unpleasant natural phenomena. (However this is important on the whole site)

A.3- Furniture safety

This according to parks` main furniture is expressed in 3 groups as below.

A.3.1- Benches& tables safety

- 1- At least in 5% of fixed bench& tables these standards are regarded. First for benches:
 - Firm, curved and about 50(cm) back
 - An angle of about 95-105 ° among back& seat
 - An angle of about 2-10 ° among seat& floor
 - Seat depth of about 30-45(cm) in seats having back and 75(cm) in others(which are not recommended especially for aged)
 - About 60(cm) length for each person
 - 35-45(cm) height
 - No projected legs
 - No sharp-pointed edge[7]
 - Firm, curved and wide-enough(3.5-4cm) arms
 - A distance of about 60(cm) from pathway
 - Materials of high thermal index

While for tables:

- 710-865(mm) height
 - 760(mm) width
 - 485(mm) depth
 - At least 685(mm) free space beneath as knee space
 - No sharp-pointed edge
- 2- There are some movable seats or spaces for wheelchairs. (1 for each 4-25 sitting places).[12]

A.3.2- Fences& handles safety

- 1- The below handrails standards are considered.
 - handrails of about 61-64(cm) near steps& 75-80(cm) near ramps
 - 30(cm) handrails projection from both the beginning& the end
 - Curved surface, by a diameter of about 3.5-4(cm)
 - Being fixed in about 5(cm) to the side walls with soft surface
 - Being fixed in depth of 7.5(cm), with about 4.5(cm) free space above
 - Indirect lightening along the handrails
 - Using materials of high thermal indexes
- 2- All the infrastructures are covered with boxes.
- 3- There are fences beginning from the floor -considering handrails standards- along all height differences.
- 4- No projected and sharp-pointed fence or bungs (especially those on floor which are vertical to the movement route).

A.3.3- Signs& boards safety

- 1- All visual signs considered the below standards.
 - Using xenon lamps
 - White or light enough lamps colors

- Maximum light persistency¹ of about 0.2 seconds with maximum efficiency of about 40%)
 - Minimum light intensity of about 75(ca)
 - Radiation amount of about 1-3(Hz)
 - Being located at 2030(mm) above the floor or 152(mm) beneath the roof, moreover signs about 152(mm) above the floor for those on wheelchairs
 - At least 15(m) spaces between each sign
 - Regarding the ratio of width to height of about 1:1 or 3:5
 - Along with all texts there are some figures
 - An opaque background with bright, night-colored texts and figures
 - Written signs or text on the floor
- 2- There are helping signs regarding these characteristics.
- Working with power less than 22(N)
 - Being used with other types of signs (visual, auditory...)
- 3- There are auditory signs the same as below.
- Sounds at least 15(db) and not more than 120(db)
- 4- There are touching signs the same as below.
- High textural differences
 - High thermal indexes
- 5- There are smell signs the same as below.
- Intense sweet scents
 - No allergen material to give scent
- 6- All these signs are used along with each other.

A. SECURITY

- 1- The access network is organic or a mix of organic& geometric.
- 2- All parts are lit enough for the whole day& night.[1]
- 3- Information station, phone boxes (at least 1 writing one for each 4, which are in height of about 380-1220(mm)for front access or 230-1370(mm)for side access.)and other serving services are dispersed equally and they are close to senior`s special places.
- 4-There is no useless usage or structure in the park.[13]
- 5- However there are places for seniors -to talk, meet their friends, review their memories and...-, but they are not separated completely.
- 6- There are places for both individual and group activities.
- 7- There are sitting areas of personal distances (45-120cm), close social relation distances(120-210), far social relation distances(210-360), close public distances(360-750) and far public distances(+750), with the angel of about 90-120°. [7]
- 8- There isn't any unsecure snug (blind points) anywhere and a clear visibility to all parts is regarded.[14]
- 9- Some specific visual elements are scattered in different key points.
- 10- There is a hierarchy in usage placements.

B. ENVIRONMENTAL SANITATION

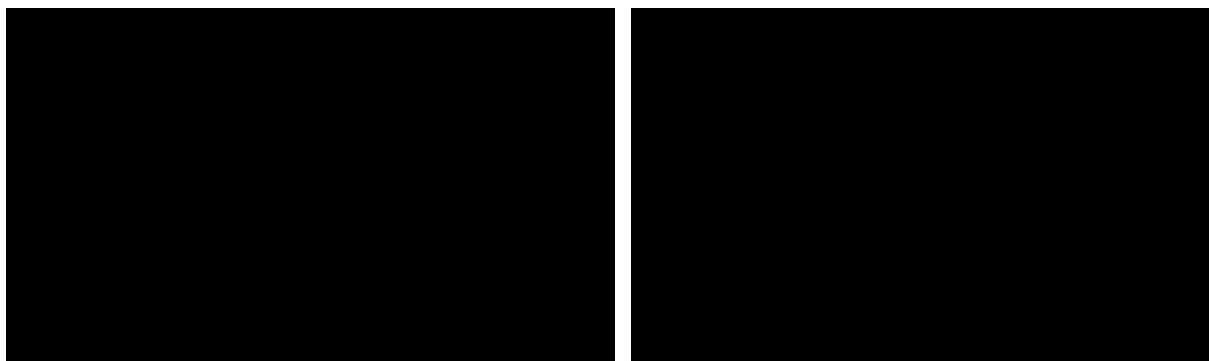
- 1- Park is away from crowded, noisy& polluted places.[1]
- 2- There is a possibility of contact with nature.
- 3- Different colors, textures, forms, smells and... is formed with different plant design.
- 4- The minimum ratio of green space to the structured is regarded.
- 5- All the plant types are non-allergen, non-toxic and non-fruitful.[14]
- 6- There are enough numbers of usable trash-cans.
- 7- Park has a regular cleaning schedule.

Examining Sari's urban with this checklist showed the results below:

Table 2.physiological expectations of aging

Name of the urban park	safety	security	Clean environment	Total desirability
Ghaem	%43	%73	%86	%22.5
Shahrdari	%51	%60	%57	%19
Aftab	%50	%53	%71	%19.5
Sang	%36	%73	%86	%22
Shams	%33	%47	%71	%17
Total desirability	%24	%34	%42	

¹ The time duration between beginning and finishing 10% of the sign is called persistency.



So it can be concluded that age-friendly urban parks' criterions are only required less than 50% in Sari's urban parks, also safety is the weakest and clean environment is the best required criterions in these parks, and because of the importance of safety parameter -answering physical expectations which are inevitable and common among all the aged- it is necessary take it's cases into account in these parks firstly to upgrade their quality for the aging population.

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