



## Ergonomic Assessment of Old Age Homes in North India

### KEYWORDS

ergonomic assessment, elderly, old age home, health hazards

**Shewanti N. Kashyap**

Ph.d Department of Family Resource Management, College of Home Science Rajendra Agricultural University, Pusa (Samastipur) Bihar – 848125

**ABSTRACT** *This paper aims to provide guidelines for designing living places with ergonomically designed fixtures, facilities and spaces for elderly. The present study was conducted in four old age homes in two regions of Uttarakhand State of India (Kumaon and Garhwal). Data were collected through observations, measurements, checklist and interviews about the structures, fixtures, facilities and storage spaces of the homes. The findings depicted that doors, windows, switches, power outlets, sink, toilets, bathroom, handrail; storage spaces were not comfortable to the elderly people. Cupboards with difficult access make elderly people take uncomfortable positions flexing their bodies extend their necks. Especially the illuminations level was not friendly to the elderly. The total score obtained was highest (14) for old age home IIIrd (Vridh Sewa) and lowest (11) for old age home Ist (Nirmala), it was inferred that the old age home Ist (Nirmala) was superior to other. These findings will assist designers to plan and design accessible living environments better suited to the elderly.*

### INTRODUCTION

As of 2011, India is a population of 1.21 billion people. It is the second most populous country in the world, only to China. On account of better education, health facilities and increase in life expectancy, the percentage of elderly population (60+) has increased by 54.77 per cent in the last 15 years. The growing incidence of elder abuse and severe fissures in the multigenerational family or household has forced many older persons to abandon their family home; some of them have also been "pushed out" and have thus been left shelter-less. Old Age Homes of various types are rapidly becoming a choice for many "left out" or "neglected" old persons with or without survival resources. Home ergonomics is the idea of having components of a home that have been designed with the body's comfort in mind. The purpose is to enable them to execute their daily activities more comfortably, safely and without help. The most important thing is to ensure that it is height adjustable. In addition, the study of human factors can help in designing products and environments that are more efficient, comfortable, and safe (Gosbee, 2002). In order to increase the quality of old people lives, safety, comfort and physical and social health, must be taken care of (J. J. D. Câmara *et al.* 2010). Anthropometry is essential for designing safe products best suited to their users, including designing products for older people, tooling aids, living facilities, ergonomically designed facilities such as storage shelves, kitchens, bedrooms, furniture and work stations for them to execute their tasks. The main purposes of ergonomic assessment are the identification of specific risk factors for falling in elderly people. It can be avoided with common sense and inexpensive measures.

### MATERIAL AND METHODS

Purposive sampling design was chosen to select the samples. The present study was conducted in four old age homes in two regions of Uttarakhand State of India (Kumaon and Garhwal). Data were collected through measurements and interviews about the structures, fixtures, facilities and storage spaces of the homes. Observations were made to determine the design and suitability of interior (bathrooms, toilets and bedrooms) and exterior (corridors, ramps, handrails) facilities. The checklist was made

to assess the old age homes ergonomically. For the quantification of qualitative data numerical values was assigned to the response *i.e.* for Yes response received was denominated one as score which was interpreted as risk involved, whereas, for the response No, no numerical value *i.e.* zero was interpreted as no risk, whereas higher the 1 scores greater the risk.

### RESULTS AND DISCUSSION

The findings are summarized in Table 1 showed that doors, windows, switches, power outlets, sink, toilets, bathroom, handrail, storage spaces were not comfortable to the elderly people. Doors were of different sizes, heights and widths (bedrooms, bathrooms and toilets) among all old age homes. Windows were of different heights and were difficult to open (Jalousie type). Switches and power outlets were located at different heights. Toilets were of different sizes (Sitting and squatting types), posing difficulties for elderly. Toilet seat heights (range, 390-410 mm) are of standard type but not specially designed for elderly users. A few have handrails or grab bars of different heights (range, 30-40 mm) and diameters. Most doors open towards the inside (uncomfortable for users), posing problems if accidents occur inside. No non-skid mat installed (to avoid slipping and falls) in toilet and bathroom. No temporary storage, installed hooks in the bathroom. Cupboards with difficult access make people take uncomfortable positions flexing their bodies, extend their necks. The lower parts of cupboards, situated under the workbench down to the floor, without setback or space for the feet, also cause discomfort.

The findings summarized in Table 2 showed that the ceilings, walls were not sound and free from hazardous defects like damaged; large holes etc. in all the four old age homes. Old age home II<sup>nd</sup> (Geeta Kutir) and III<sup>rd</sup> (Vridh Sewa) the roof did not permit effectual drainage of rain waters, which caused dampness in the wall and this affected the health of the elderly causing respiratory problems. The material used for door was not resistant against moisture. Absences of safety architectural symbols like main fuse board, switch outlets, fan and regulator etc. in electric installation were the major shortcoming that caused incon-

venience and hazards safety. The floorings of the habitat rooms were not specific, smooth and of grease proof material (skid resistance tiles) particularly in bath with water closets to avoid any accidental slips/falls. The floor of the bath with water closets was not sloped towards the drain with a suitable grade and also not uniform but was raised to make the difference between bath and water closet in old age home II<sup>nd</sup> (Geeta Kutir). Major concerns especially for elderly females were the height of windows, ventilators, storage spaces, and also the furniture. The fittings and fixtures of bath and electric were not suitable and not made keeping into consideration the body dimension of elderly people. The environmental parameters specially the illuminations level was not friendly to the elderly people and caused accidental injuries. Good lighting not only assists with reading and safety, it helps prevent depression for those confined indoors. If cost is a concern, the improved, inexpensive fluorescent light bulbs may be satisfactory. The total score obtained was highest (14) for old age home III<sup>rd</sup> (Vridh Sewa) and lowest (11) for old age home I<sup>st</sup> (Nirmala), it was inferred that the old age home I<sup>st</sup> (Nirmala) was superior to other. Similar finding (SNSA Rashid *et al* 2008) was that elderly people should be provided with specific-

ly designed facilities to meet their physical and cognitive strengths, capabilities and limitations, and to match their body dimensions.

### CONCLUSION

Elderly people should be provided with living environments with specifically designed facilities appropriate for their physical and cognitive strengths, capabilities and limitations, and to match their body dimensions. The designs of all four old age homes did not take the anthropometric measurements of older Indians into account and may therefore cause discomfort.

Aging increases postural instability, thus the installation of supporting bars and improvements on circulation areas should be considered. Another contribution is to place the most used objects in areas where old people can see and reach them easily. After identifying all these problems, use of the ergonomics approach and gerontechnology enables ageing people to better adapt to their environment, and provides an integrated strategy for well being and satisfaction when ageing.

**Table 1 Summary of the findings based on observation**

Sl. No	Fixture	Findings
1	Door	1. Different sizes, heights and widths (bedrooms, bathrooms and toilets) among all old age homes 2. Lever-action and round knob (easy to open) 3. Knob heights (range, 920-1290 mm) 4. No auxiliary handrail
2	Window	1. Different heights among all old age homes 2. Difficult to open (Jalousie type)
3	Switch	1. Both switches are close together (easy for elderly user) 2. Different heights ( bedrooms, bathrooms and toilets) among all old age homes 3. One publicly funded old age homes installed switches near the beds
4	Power outlet	1. Mostly located in the room (for TV, radio, etc) 2. 3-pin type power outlet 3. Located at different heights among all old age homes
5	Sink	1. Different shapes, sizes and heights 2. Different water outlet design 3. Water outlet is difficult to open (basic type)
6	Toilet	1. Sitting and squatting types, posing difficulties for elderly users 2. Toilet seat heights (range, 390-410 mm) are of standard type but not specially designed for elderly users 3. Lever-action type (pump) 4. A few have handrails or grab bars of different heights (range, 30-40 mm) and diameters 5. Different sizes of toilets 6. Most doors open towards the inside (uncomfortable for users), posing problems if accidents occur inside 7. Different height of water outlet 8. No non-skid mat installed (to avoid slipping and falls)
7	Bathrooms	1. Most have separate bathrooms and toilets 2. Fixed and adjustable shower head 3. A few installed handrails of different heights (range, 30-40 mm) and diameters 4. No temporary storage 5. A few have installed hooks 6. No non-skid mat installed (to avoid slipping and falls)
8	Handrail	1. Not standardized, different heights and diameters
9.	Storage space	1. Cupboards with difficult access make people take uncomfortable positions flexing their bodies, extend their necks. 2. The lower parts of cupboards, situated under the workbench down to the floor, without setback or space for the feet,

Table 2 Ergonomic assessment of old age homes

Description	Old age homes			
	Nirmala	Geeta Kutir	Vridh Sewa	Prem Dham
	I	II	III	IV
	Score	Score	Score	Score
1. Habitat room	1	1	1	1
2. Bath with water closet	1	1	1	1
3. Ceiling free from hazardous defects	1	1	1	1
4. Walls free from hazardous defects	1	1	1	1
5. Permanent passageways marked	0	0	0	0
6. Roof permit effectual drainage of rain water	1	0	0	1
7. Door and doorways have clear opening	1	1	1	1
8. Enough number of door, window, ventilator	1	1	1	1
9. Cross ventilation	0	1	1	1
10. Proper electric wiring	1	1	1	0
11. Suitability of height of electric switches	0	0	1	0
12. Safety architectural symbols on electric installation	0	0	0	1
13. Floor designed evenly	1	1	1	1
14. Stairways safe and no slippery	1	1	1	0
15. Accessibility of bath with water closet	1	1	1	0
16. Minimum fresh air requirement for toilet exhaust	0	0	0	0
17. Flooring of bathroom of grease proof	0	0	0	0
18. Bathroom floor sloped suitably towards the drains	0	0	0	0
19. Uniform / elevated / depressed floors	1	0	1	0
20. Corner between the walls rounded	0	0	0	0
21. Chair designed ergonomically	0	0	0	0
22. Bed designed ergonomically	0	0	0	0
23. Table designed ergonomically	0	0	0	1
24. Fittings and fixtures designed ergonomically	0	0	1	0
25. Height of window, ventilator suitably designed	0	0	0	0
26. Height of the storage spaces	0	0	0	0
27. Environmental parameters	0	0	0	0
Total score:	12	11	14	12

## REFERENCE

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