Creating enabling environments for Indian elderly; Methodology for identification of environmental challenges

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Abstract. The aim of the paper is to understand the situations of Indian elderly and to generate design parameters which when followed will create enabling environment for Indian elderly. To begin with an extensive literature review is done to understand aging, associated problems and the International concepts. Then a field survey is performed to identify the challenges elderly face in activities of daily living (ADLs) in Indian context. The survey is done for the upcoming urban housing typologies in India. These upcoming typologies are identified with market survey and scientific layering of the data. Then 27 elderly in the age group of 60 to 85 years representing independent elderly, frail elderly, and dependent elderly are studied using different environment-behaviour research tools, living in joint and nuclear families, in identified housing typologies. The collected data from interview questionnaires, audios, traces and photographs, is analyzed in layers to identify 26 environmental issues. Based on these identified issues, analysis and synthesis is done to identify the possibilities of interventions at architecture design level, to create Inclusive enabling environments for Indian elderly.

Keywords. Elderly and Design, Environment and Behavior Research Tools, Research Methods

Introduction

In India demographic transition is contributing to ageing population. The increased birth rate, decreased mortality rate, increased life expectancy is resulting in increased elderly population. By 2023 India will be having the largest population of elderly (Age in motion graph, Helpage India, 2010). Longevity by itself is to be celebrated, but increasing vulnerabilities of the elderly arising out of poverty, rural living, income insecurity, illiteracy, age related morbidity, dependency and decreasing support base requires attention. In most of the western countries, advanced stages of development preceded population ageing but the same is not true for many developing and middle-income countries, including India [1],[2],[3]. The Government of India, being a signatory to Madrid International Plan of Action on Ageing, deserves recognition for its foresight in drafting a National Policy on Older Persons (NPOP) in 1999. The NPOP is coordinated by the Ministry of Social Justice and Empowerment (MOSJE) and implemented through the respective mandates of several ministries. The revised National Policy for Senior Citizens (NPSC) recommends eight areas of intervention, namely income security in old age, health care, safety and security, housing, productive

ageing, welfare, multigenerational bonding, and enhancing involvement and participation of media on ageing issues. The NPSC is currently awaiting cabinet approval (Report on the status of elderly in selected states of India [4]).

The physical environment, as it relates to the dependencies of older adults, remains one of the most overlooked areas in environmental design. In order to move beyond this status quo, persons responsible for planning that environment must develop a new understanding of ways in which their influence can improve the older adult's physical and mental functioning. [3]

The current paper is part of a research which is a systematic study to understand the situations of elderly in India and investigate how enabling environments for the Indian elderly can be achieved through evidence based methodological process The identified issues are analyzed, synthesized and tested based on architectural design solutions, for the formulation of guidelines to create inclusive, enabling environments for the Indian elderly.

1. Background

As people age, certain sensory changes cause them to perceive and respond to the physical environment in different ways: a person may walk more slowly, move more deliberately, hold reading material farther from the eyes, or strain to distinguish a voice in crowd. As more and more limitations in functioning are experienced, the person becomes more dependent on environment for support [3]. As strength fails and as sensory organs incur deprivation, the individual experiencing these losses reaches out to both the general social environment and physical environment in order to continue functioning [5]. Sensory changes not only increase as people grow older but are usually compounded by the simultaneous occurrence of changes in several sensory systems. However, the age of onset and the rate of decline for these functions differ markedly among and within the various sensory systems [6].

The Indian situations are very complex with the huge size of country, diversity of social, cultural, economic and political background, wide variety of people with different religions, cast etc[7]. With severely different demographics, characteristically interdependent social scenario, culturally different society, wide range of economic disparity, religious and traditional systems and beliefs, the Indian situations are entirely different from the western world [8]. Borrowing any concept without understanding the needs and aspirations of Indian elderly and their applicability to Indian situations may result in a catastrophe [9].

2. Objectives

The aim of the current research is to develop environmental design guidelines, following which inclusive, enabling environments for the Indian elderly can be created in the urban residential neighborhood. The present paper attempts to understand the elderly in their own residential environment, to identify the challenges they face in their residential neighborhood. The area of research is limited to investigate the situations of the Indian elderly in the residential neighborhood of the urban areas. The study is further focused to the upcoming typologies of housing in India.

3. Research Methodology

The study investigates the problems and issues elderly face with their environment. It attempts to identify the issues to enumerate, analyze and synthesize those to establish and develop a set of guidelines to create enabling environments for the Indian elderly. It is an attempt to understand the human behaviour with respect to its environment.

To begin with an extensive review of literature from secondary sources (journals, documents, Internet resources, articles, books etc.) is done to understand the various concepts of accessibility and universal design. Parallel, a literature review is done to understand the situations of the elderly in India, and international studies on elderly and environment. To further understand the problems of the Indian elderly and to identify the possible design solutions, the methodology adopted is stated in the schematic diagram (Methodology of research-Figure 1).

To identify the environmental needs of Indian elderly a field survey is performed based on (ADL's) Activities of Daily Living of elderly. The research further aims to develop a conceptual design framework with applications of Universal Design Principles, Universal Design India Principles and the Enabling Environment theories, for the identified challenges.

Based on conceptual design framework design parameters will be developed to achieve the enabling environments for the Indian elderly. These parameters will then be tested with focus group discussions for confirmation of applicability for the Indian elderly. The elderly interact with their environment at micro, meso and macro level in terms of product design level, interior design level, architectural design level, neighborhood level and city planning level. This study is focused and limited to the interior design level and Architectural design level.

3.1. The field survey

An extensive field survey was conducted using multiple environment-behavior tools to identify the challenges Indian elderly face in the residential environment, as shown in Figure 1 [10, 13]. The focus of this survey was to understand the situations of elderly in their own residential environment and to identify the challenges elderly face in their Activities of Daily living. Based on these identifications a comprehensive list of issues for the challenges elderly face was prepared.
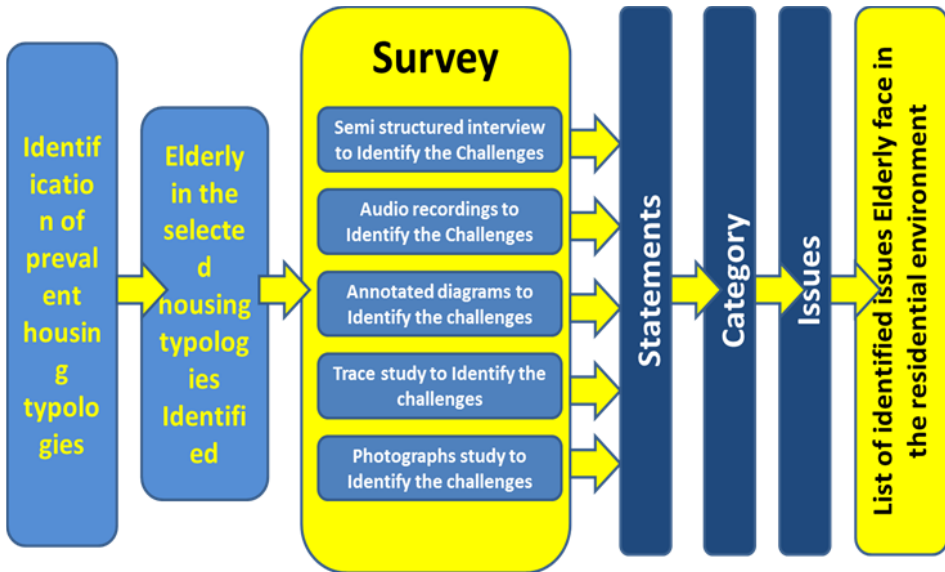
Figure 1: Methodology of survey

3.2. Sampling of Housing Typologies

The prevalent housing typologies were identified by collecting the various brochures of the new housings in Bhopal city in India. The overlapping of various floor plans of apartments, row houses, single houses, detached, semi- detached houses was done to select the sample of housing typologies. Dwelling units from similar newer existing housings were also selected. Then the elderly residing in these typologies were interviewed (Table 1). The overall sample from the identified typologies of housing consisted of 34 elderly, and 07 elderly were from the Citizen Old age home and Anand Dham Old age home of Bhopal. In all 27 + 7 elderly were interviewed for the identification of Challenges.

4. Research Tools

The field survey was an attempt to collect the qualitative data through understanding the ADL's of the Indian elderly. A multiple layering of the below mentioned tools was applied for the collection of data.

- Interviews with Semi structured questionnaire focused on the ADL's of the elderly.
- Audio recordings of the complete interview.
- Annotated Diagrams of the residence and the neighbourhood of the elderly to understand the spatial needs and aspirations.
- Trace study through photographs and observations of the residential environment.

4.1. Semi structured interviews

The home of the elderly is his own space in which he lives. The qualitative aspects this human space relationship needs to be understood for which the interviews were focused on Activities of Daily Living. A semi structured questionnaire is prepared which guided the whole interviews for the identification of ADL's. Thus for the assessment it is important to understand;

- What are the immediate needs and future aspirations?
- What are the activities of daily living?
- What are the functional abilities of the person?
- How the elderly perform their ADL's?
- What activities of daily living are most difficult?
- How is the space in their environment utilized by the elderly?
- What is the level of independence?
- What role, if any, do the caregivers have?

Therefore the interviews aimed to identify activities of daily living in terms of early morning activities, oral hygiene, using toilet, bowel/ bladder control, grooming, pooja (prayer), dressing, meal planning, cooking, eating, mobility inside the residence, mobility outside the residence, using stairs, daily job/ work, driving, house hold chores, doing laundry, using phone, managing own medications, money management etc in detail.

4.2. Audio Recordings

The audio of each interview is heard by five people for the identification of the issues each elderly is talking about. The overlapping of the five peoples understandings resulted in the identification of category of challenges elderly face in their ADL's. These identified categories are then summarized as issues which elderly face (Table 2).

Table 1 Identification of issues elderly face

S. No.	Category	Environmental issues	Definition of Environmental challenge
1.	door areas: Non slippery floors. Wet areas in toilet. Safety while climbing stairs. Safety while working in kitchen. Safety within home. t doors: Safety from vehicles while waking. Surfaces	**Safety issues**	Needs for safety in residential indoor and outdoor areas while using rooms, kitchen, stairs, toilets etc and outdoor areas in terms of their use and the materials.
2.	Using some kind of mobility device. Walking with some support. Need of a mobility device.	**Mobility issues**	Need of mobility device or support of environment for mobility of elderly.
3	Due to joint pain, slow movement. Problems in negotiating levels. Slow walk, slow hand movement. Problems in sitting, bending. Gets tired in walking.	**Dexterity issues**	Need of environmental support for the problems of slow movement of elderly.
4	Problems in less light.	**Vision**	Need of improvement in environment for

	Use of reading glasses. Prefer area of more light. avoid glare More natural light. Problems in finding small objects. Problem to put thread in needle.	**related issues**	better vision such as improvement in environment in terms of light, glare, colour and depth perception, clear vision etc.
5	Problems in hearing. People need to speak loudly. Not comfortable in noise. Sound of vehicles passing by. Sound of loud speakers. Problems in use of phone	**Hearing related issues**	Need for improvement in environment for clarity of sound and better hearing.
6	Take medicine for Blood pressure, Diabetes, Asthma, Cardiac problems etc. Dietary prescriptions. Difficulty in speaking. Shivering hands. Arthritis / Joint pain.	**Health issues**	Need of improvement in environment for better support for the Issues of health due to various diseases such as Blood pressure, Diabetes, Asthma, Cardiac problems.
7	Forget things. Can't find things after keeping. Forget to take medicine. Forget where the medicine kept. Preparation of schedule. Difficulty in remembering. Own way of problem solving.	**Memory issues**	Need of environmental support to improve the situations of memory loss.
8	Provision of ample light. Light and ventilation in rooms. Light and ventilation in toilets. Natural Light and air circulation. No dark & dingy spaces	**Light Ventilation issues**	Need of provision of proper light and ventilation in the elements of residential design.

4.3. Annotated diagrams

After each interview, rough annotated diagrams (Figure 2) were prepared to understand the pattern spatial usage. Findings from these documented diagrams are then analyzed to understand the challenges faced by the elderly.
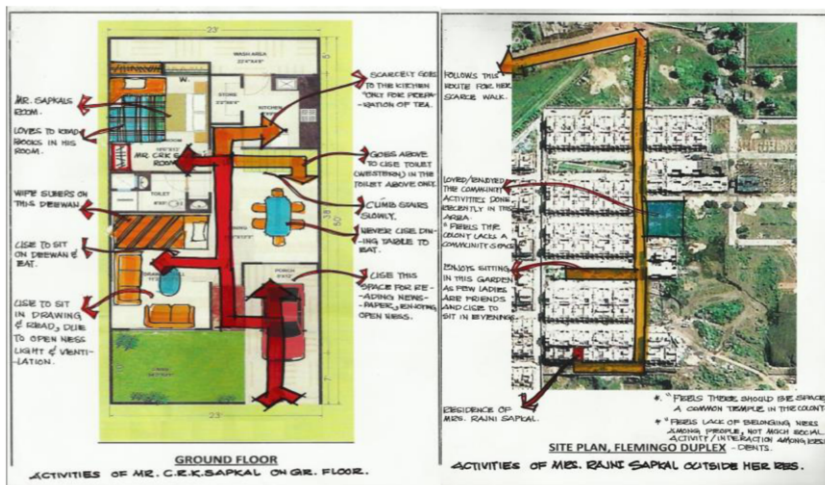

Figure 2: Annotated diagrams

4.4. Environmental Observation and Trace study

The environment of elderly are also analyzed through environmental observation and trace study to further identify the challenges as shown in the Figure 3.

Figure 3: Trace Study

5. Method of Identification of Issues

The identified issues are then overlaid to formulate a common list of issues faced by the elderly. Every issue is rated for its level of importance and the table below lists these issues (Table 2) in random order.

Table 2: List of Environmental Attributes for Indian Elderly

S.No	Enabling environment issues for Indian Elderly	S.No	Enabling environment issues for Indian Elderly
1	Environmental Safety	11	Environment for Socio-cultural connect
2	Environmental Support for mobility	12	Affordable environment
3	Environmental support for vision	13	Environmental support for Leisure and recreation
4	Environmental support for hearing	14	Environmental support to reduce vulnerability and anxiety
5	Light and Ventilation	15	Environment close to the nature
6	Health	16	Environment with Spiritual connect
7	Environmental support for Memory	17	Environment with less technology dependence
8	Privacy and opportunities for personalization in the environment	18	Environment with ease of use
9	Environmental support for Independence	19	Environment supporting Emotional comfort/loneliness/ personalization/ vulnerability
10	Environmental support for Interdependence	20	Loneliness/ social connect

6. Further work

As this paper is a part of an ongoing research, the work will continue after the identification of issues. The issues will be tested by the experts of the field on a rating scale to further check and reconfirm the issues. The tested environmental issues will then be analyzed and synthesized with respect to the dwelling unit elements to develop the environmental design guidelines, following which inclusive, enabling environments can be created for the Indian elderly.

7. Conclusions

Increasing urbanization, modernization, commercialization, changing demographics, changing social scenario, depleting joint families and increasing numbers of nuclear families is resulting in exclusion of the elderly in India. Moreover poor implementation of accessibility guidelines and insensitive environmental designs of designers, architects and planners, has made the life of the elderly difficult in India [12, 14].

With severely different demographics, characteristically interdependent social scenario, culturally different society, wide range of economic disparity, religious and traditional systems and beliefs, the Indian situations are entirely different from the other countries[14]. The current research study is propelled by the belief that as people age, physical changes, sensory changes, changes in reflexes and responses, change in socio-economic conditions, change the ways to perceive and respond to the physical environment [11, 15]. Improvements in the environment with respect to the needs of elderly can improve the situation of elderly. The present paper attempts to identify environmental issues of importance in Indian context using environmental behavior research tools.

The paper is part of a research which is a systematic study to understand the situations of elderly in India and investigate how enabling environments for the Indian elderly can be achieved through evidence based methodological process. In future course of study, the identified issues would be analyzed, synthesized and tested based on architectural design solutions, for the formulation of guidelines to create inclusive, enabling environments for the Indian elderly.

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