

Dimensions and availability of light in bathroom and water closets

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■ **ABSTRACT** : Home is the one where we spend our valuable time with family, hence the special features with regard to interior should be taken into consideration especially for the elderly people. The present study was conducted during the year 2017-2018, in urban areas of Dharwad district, Karnataka, India. The sample consisted of 120 elderly population aged 60 years and above. Exploratory research design and self structured interview schedule were used to conduct the study. In houses of majority of male and female respondents, separate bathroom and water closets were present. The size of maximum number of bathroom and water closets were bigger than the standard recommended. It was good to know that none of the bathroom and water closets were smaller than the standard recommended. The availability of natural light in maximum number of bathroom and water closets was more than the standard recommended by the BIS. But the reverse trend was observed with respect to availability of artificial light, which disclose that the intensity of artificial light in maximum number of bathroom and water closets was less than the standard recommended.

■ **KEY WORDS**: Existing housing conditions, Bathroom, Water closets, Elderly

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Home is the one where we spend our valuable time with family hence the special features with regard to interior should be taken into consideration especially for the elderly people. In the urban areas due to space problems the physical aspects present in housing accommodation may not be in good condition, hence housing may be less comfortable for the aged people. So suitable considerations should be taken while planning keeping the elderly generation in mind. There is a strong relationship between ergonomics, interior and old age people. As the age increases there

will be increase in physical, physiological, body pain and psychological health problems. Hence for these health problems they need a proper medication and also a good environment around them. The physical design of housing interior plays a major role in influencing the quality of life of all elderly residents. Sheehan (1992) stated that the physical design of housing interiors plays a major role in influencing the quality of life of all elderly residents. In order to continue the design criteria and recommendation for housing for elderly persons, one must first be aware of the functional needs of the residents.

One must consider that ageing is a process, and the functional levels of each individual will generally decrease at different rates. Hence, during in old age the structural facilities of home should be given more importance than the functional facilities, but now a day the functional design is given more importance. Apart from the structural design housing should fulfill the needs of safety, comfort and privacy. The utilization of space, positioning of building materials, flooring and number of doors windows and their dimensions should be taken into consideration and should be planned keeping the elderly people in mind. Poor functional design may cause injuries and accidents due to falls. In order to achieve a good interior design, it should be planned carefully.

We must have vision and find the solutions for today's problems. The city of tomorrow cannot solve urban housing problems without considering the housing problems of elderly people. Many people who live alone are middle aged or elderly and are logging to be close to other people. The bathroom is one of the crucial areas of the home where every family member needs to pay frequent visits. The slippery floors and smooth surfaces and lack of grab bars can make their visits traumatic and accidents more for people especially for children and elderly. To avoid these problems in the bathroom and water closets, there is need for ergonomics approach to interiors of bathroom and water closets conditions.

Ergonomics is defined as the study of the anatomical, psychological and physiological aspects of man in his working environment, with the objective of optimizing human safety, health, comfort and efficiency. Modern ergonomics increasingly deals with problems of adjusting the environmental conditions to their needs of people of limited ability as well. Poor ergonomic design can cause pain, discomfort and injury, poor aesthetic image can create stigma and decrease the pleasure in using spaces or objects (Allan *et al.*, 1996). Thus, home ergonomics is becoming very important amongst home scientist, ergonomist, industrialist, builders and interior designers. Safety problems belong to the basic objectives of shaping the artificial environment of human life. Attention is focused mostly on road accidents and work environment; less attention is played to dangers arising in housing. Only few studies have emphasized on such fall risk and bathroom hazards. Bathroom safety is important for safe and independent living of elderly.

■ RESEARCH METHODS

The present study was conducted during the year 2017-2018, in urban areas of Dharwad district, Karnataka, India. In the present investigation, exploratory research design was used. A total sample of 120 elderly population including both male and female aged 60 years and above residing in Hubli and Dharwad cities were selected using random sampling technique. The pre-structured schedule was formulated to collect and observe the required information from the sample under the study by reviewing the relevant review of literature and consulting the subject specialist. The physical parameters were like the dimensions and intensity of light available in bathroom and water closets were measured by the equipment such as measuring tape and LUX meter, respectively. The data collected was tabulated by keeping in view the objectives of the study.

■ RESEARCH FINDINGS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Existing housing conditions of selected elderly:

Existing housing conditions of the selected elderly is presented in Table 1. Higher per cent of both elderly male and female respondents (87.10 % and 76 %, respectively) were living in RCC type house and it was owned by them. The house were constructed recently *i.e.*, within 10 years of period.

Further it was observed with respect to housing tenure *i.e.* majority of male (87.1 %) and female respondents (94 %) were living in own house, whereas 12.8 per cent of male and 6 per cent of female respondents were living in rented house.

The year of construction of house was categorized into three groups and in which maximum number of male (62.85 %) and female respondents (52 %) belonged to the category of less than 10 years, while 31.42 per cent of male and 38 per cent of the female respondents belonged to the category of 10-20 years. Remaining percentage *i.e.* 4.20 per cent of male and 10 per cent of female respondents belonged to category of above 20 years.

Irrespective of gender, majority of the respondents belonged to the category of less than 10 years (59.16 %) followed by 10-20 years (34.16) and more than 20

Particulars	Respondents		Total
	Male (n=70)	Female (n=50)	
Table 1: Existing housing conditions of the selected elderly (n=120)			
Type of house			
RCC	61 (87.1)	38 (76.00)	99 (82.5)
Tiled house	09 (12.8)	12 (24.00)	21 (17.5)
Housing tenure			
Rented	09 (12.8)	03 (6.00)	12 (10.00)
Own	61 (87.1)	47 (94.00)	108 (90.00)
Construction of house (in years)			
<10 years	44 (62.85)	26 (52.00)	71 (59.16)
10-20 years	22 (31.42)	19 (38.00)	41 (34.16)
>20 years	03 (4.20)	05 (10.00)	08 (6.66)
Presence of bathroom and water closets			
Separate bathroom and water closets	54 (77.1)	40 (80.00)	94 (78.3)
Bathroom cum water closet	16 (13.3)	10 (20.00)	26 (21.6)

Figures in the parentheses indicate percentage

years (6.66 %).

In houses of majority of male (77.10 %) and female respondents (80 %), separate bathroom and water closets were present, while in 13.30 per cent and 20 per cent houses of male and female respondents, respectively, bathroom cum water closet was present.

The dimensions of bathroom and water closets in the houses of selected elderly were compared with the standard dimensions of bathroom and water closets given by Model Building Bye Laws, 2016. The details are shown in Table 2. The width of the maximum number of bathrooms (71.27 %) was wider than the standards recommended, while 28.72 per cent of the bathroom were on par with recommended standard width. Similar trend was observed with respect to the height of the bathroom. The height of maximum number (53.19 %) of the bathrooms was more than the standards recommended, while 46.80 per cent of them were on par with the standards. Similarly, regarding the length of the bathroom, the length of maximum number (72.34 %) of the bathroom was more than the standards recommended, while 27.65 per cent of them were on par with the standards. The area, of maximum number (92.55 %) of the bathrooms was more than the standards recommended by Model Building Bye Laws (2016), while 7.44 per cent of them were on par with the standards.

Regarding the width of the water closet, about 58.51 per cent of water closet were wider than the standards recommended, while 41.48 per cent of the bathrooms were on par with recommended standard width. Similar

trend was observed with respect to height of the water closet, where the height of maximum number (57.44 %) of the water closets was more than the standards recommended, while 42.55 per cent of them were on par with the standards. Similarly, the length maximum number of the water closets (60.63 %) was more than the standards recommended, while 39.36 per cent of them were on par with the standards. The area, of maximum number of the water closets (71.27 %) was more than the standards recommended, while 28.72 per cent of them were on par with the standards.

Regarding the width of bathroom cum water closets, the maximum number (73.07 %) of the bathroom cum water closets were wider than the standards recommended, while 26.92 per cent of them were on par with the standards. Similar trend was observed with respect to height of the bathroom cum water closet, *i.e.* the height of maximum number (76.92 %) of the bathroom cum water closets was more than the standards recommended, while 23.07 per cent of them were on par with the standards. Regarding the length, maximum number the bathroom cum water closets (42.30 %) of were above the standards recommended followed by on par with the standards (30.76 %) and less than the standards recommended (26.92 %). The area of maximum number (73.07 %) of the bathroom cum water closets was more than the standards recommended, while 26.92 per cent of them were on par with the standards.

It can concluded that the size of maximum number of bathroom and water closets were bigger than the

Table 2 : Dimensions of bathroom and water closets of selected elderly in comparison with standards			
(N=120)			
Particulars	Bathroom (n=94)	Water closet (n=94)	Bathroom cum water closet (n=26)
Width (m)			
< Standard	-	-	-
On par with standard	27 (28.72)	39 (41.48)	07 (26.92)
> Standard	67 (71.27)	55 (58.51)	19 (73.07)
Height (m)			
< Standard	-	-	-
On par with	44 (46.80)	40 (42.55)	06 (23.07)
> Standard	50 (53.19)	54 (57.44)	20 (76.92)
Length (m)			
< Standard	-	-	07 (26.92)
On par with standard	26 (27.65)	37 (39.36)	8 (30.76)
> Standard	68 (72.34)	57 (60.63)	11 (42.30)
Area (m²)			
< Standard	-	-	-
On par with standard	7 (7.44)	27 (28.72)	7 (26.92)
> Standard	87 (92.55)	67 (71.27)	19 (73.07)

Figures in the parentheses indicate percentage

Standard dimensions: Reference: Model Building Bye Laws, 2016

standard recommended. It was good to know that none of the bathroom and water closets were smaller than the standard recommended. These results are on par with the results of Singh (2012) which revealed that in majority of the households the size of the bathrooms was bigger.

Intensity of natural and artificial light available in bathroom and water closets is depicted in Table 3. The intensity of light was measured by the Lux meter at three different timings for natural light and one reading for artificial light. These readings were compared with the standards of National Building Code of India (NBO), 1996.

The results revealed that the intensity of natural light in maximum number (60.63 %) of bathrooms of the selected households was more than the recommended standard (100 Lux) followed by below the recommended standards (39.36 %).

Likewise, in maximum number of water closets (51.06 %) the natural light was more than the standard recommended followed by less than the standard recommended (48.93 %).

Similarly, in maximum number of bathroom cum water closets (61.53 %), the intensity of natural light was more than the standard recommended followed by less than the standard recommended (38.46 %).

The reverse trend was seen in case of artificial lighting *i.e.* in maximum number (59.57 %) of the bathrooms, the intensity of artificial light was less than the standard recommended followed by more than the standard recommended (40.42 %).

Similarly, in maximum number of water closets (73.40 %), the intensity of artificial light was less than the standard recommended (26.59 %).

Likewise, majority of the bathroom cum water closet (61.53 %), the intensity of artificial light was less than

Table 3: Quantity of natural and artificial light available in bathroom and water closets			
(n=120)			
Type of light	Bathroom (n=94)	Water closet (n=94)	Bathroom cum water closet (n=26)
Natural light			
< 100	37 (39.36)	46 (48.93)	10 (38.46)
> 100	57 (60.63)	48 (51.06)	16 (61.53)
Artificial light			
< 100	56 (59.57)	69 (73.40)	16 (61.53)
> 100	38 (40.42)	25 (26.59)	10 (38.46)

Figures in the parentheses indicate percentage

the recommended standard followed by more than the recommended standard (38.46 %).

Hence, with respect to lighting in bathroom and water closets it can be concluded that the intensity of natural and artificial light was measured in bathroom and water closets of the selected elderly to study the availability of light. The availability of natural light in maximum number of bathroom and water closets was more than the standard recommended by the BIS (Table 3). But the reverse trend was observed with respect to availability of artificial light, which disclose that the intensity of artificial light in maximum number of bathroom and water closets was less than the standard recommended. These results are in agreement with the findings of Sandhu *et al.* (2005) which discloses that the day light was sufficient in both bathroom and water closets. This was probably because maximum number of selected households used bulbs of low voltage as a source of artificial lighting.

Conclusion:

In majority of the houses, separate bathroom and water closets and insufficient artificial light is the common scene. Hence, it is suggested to mount bathing and toileting regions are mounted on a single piece as it is convenient and comfortable to use. Provision of ventilators and exhaust fan, use of high voltage bulbs,

bigger size electrical switches at the entrance of bathroom and water closets are also recommended in bath room and water closets for clear visibility and easy movement and to avoid bathroom hazards and to avoid suffocation among elderly.

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