Determinants of Bedroom Design in Elderly Housing

R. Unesha Fareq[1*] and T. Neeraja[1]

[1]*Department of Family Resource Management, Advanced Post Graduate Center, Acharya NG Ranga Agricultural University, Lam, Guntur-522034, Andhra Pradesh, India.*

Authors' contributions

This work was carried out in collaboration between both authors. Author RUF has carried out the proposed research work as part of Post Graduate thesis drafted the thesis and performed the statistical analysis. Author TN has designed the research work and monitored the overall research work carried out. Both authors read and approved the final manuscript.

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ABSTRACT

The study aimed to know the factors contributing to the design of a bedroom in elderly housing. Sixty elderly women in the age of sixty and above who were able to perform their daily tasks independently were chosen for the study. Purposive sampling technique was adopted to draw the sample from the randomly selected study locations. Ex post facto research design was adopted for the study. The area selected to conduct the study was Kurnool district of Andhra Pradesh. The study was conducted in the year 2019-2020.The design guidelines for bedroom in elderly housing proposed by various organizations and authors served as a base for identifying the features to measure the existing bedroom in the elderly houses. An interview cum observation schedule was designed for collecting information about the existing bedroom in elderly houses. The elderly houses were physically observed by the researcher. The existing bedroom features were measured in terms of above the recommended guidelines, exactly as per the recommended guidelines, below the recommended guidelines with scores 3,2 and 1 respectively. Frequencies and percentages were calculated for the existing bedroom features. Analysis of Variance was done to find out the relationship between independent and dependent variables of the study and Regression analysis was performed to know the factors contributing towards bedroom design. The clearance spaces in the bedroom between was found to be satisfactory in slightly more than half of the study sample.

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Corresponding author: E-mail: unirupanagudi@gmail.com;

The Significant mean difference was found between the existing bedroom and (i)type of house and (ii)family income. The two major variables that contributed to designing a bedroom as per the design guidelines were the 'Type of the house' followed by 'Family income' of the elderly people.

1. INTRODUCTION

The phenomenon of elderly people desire to live at their own houses during their last years of life is called Ageing in Place [1]. As age increases, the physical disabilities to perform various tasks and age- related diseases will arise that may lead to illness [2]. The quality of the environment where elderly residing will have an impact on the health, safety and well-being of elderly people [3,4]. A Bedroom is one of the most important room that has to be considered while designing a house for elderly people. Presence of unsteady furniture, furnishings, electrical cables, improperly assembled bed frames and poor lighting may also increase the elderly people risk of falls in the bedroom [5,6] which might be influenced by various factors such as family income, type of house, socioeconomic status. A Bedroom should be provided with furniture and furnishings that can raise the safety concern to the elderly people [7]. The infrastructure for elderly people must not contain any difficulties or obstacles, so that elderly people can easily have safe movement [8]. Elderly people feel safer due to the presence of physical features that are specially and ergonomically designed for them [9]. The present study aimed to know the factors contributing to the design of the bedroom in elderly houses.

2. MATERIALS AND METHODS

Ex post facto research design was adopted for the study. The study was conducted in the Kurnool district of Andhra Pradesh. A sample of 60 Elderly women in the age of sixty who were able to perform their tasks independently was selected for the study. Independent variables of the study include the type of house and family income whereas dependent variables of the study include were existing bedroom features.The standard design guidelines proposed by various researchers were evaluated against the existing bedroom design in the elderly housing. The existing bedroom features were measured in terms of above the recommended guidelines, exactly as per the recommended guidelines and below the recommended guidelines with scores 3,2 and 1 respectively. Independent variables of the study include the type of house and family income whereas dependent variables of the study were existing bedroom features. An interview cum observation schedule was designed for collecting information about the existing bedroom features of the elderly houses of the respondents. Frequency and percentages were calculated for existing bedroom features. Analysis of Variance was used to know the relationship between

(i) Existing bedroom and type of house and
(ii) Existing bedroom and family income.

Regression analysis was used to know the percentage contribution of independent variables towards the dependent variables.

3. RESULTS AND DISCUSSION

3.1 Existing Bedroom Design

The Standard design guidelines to design bedroom for elderly housing were given by various researchers [10,11]. The design guidelines were given in Table 1 which were evaluated against the existing bedroom conditions.

Slightly more than half of the bedrooms had clearance spaces between beds, space for bed making, space for a least used side of the bed as per the recommended guidelines.

Some of the bedrooms had inappropriate clearance spaces such as space on the sides of the bed (50%), cleaning space (90%) and space at foot or side of the bed for dressing (81.67%) space between the door to closet (43.33%).

Forty per cent of the bedrooms had a double switch beside the bed. More than half (61.67%) of the wardrobes were provided at a height below the recommended guidelines and the same was followed in providing wardrobe with sliding doors (71.67%). Seventy per cent of the bedrooms were provided with cloth rails and the majority (80%) had provided bed at the proper height.

Table 1. Distribution of respondents by existing bedroom design features n=60

Recommended design guidelines	Status of existing design features against the guidelines						Total	
	Above the recommended guidelines		Exactly as per the recomme ded guidelines		Below the recommended guidelines			
	N	%	N	%	N	%	N	%
1 foot 3 inches to 1 foot 5 inchesheight for placement of bed surface from the floor	7	11.67	53	88.33	0	0	60	100
1 foot 6 inches minimum clearance between twin bed and wall for ease of bed making	11	18.33	36	60	13	21.67	60	100
2 feet minimum clearance between beds	8	13.33	33	55	19	31.67	60	100
1 foot 10 inches for bed-making on the sides of the bed	12	20	18	30	30	50	60	100
4 feet space for cleaning from bedto wall	2	3.33	4	6.67	54	90	60	100
2 feet minimum clearance space for the least used side of the bed	7	11.67	35	58.33	18	30	60	100
Provision of double switch beside to the bed	24	40	19	31.67	17	28.33	60	100
Wardrobe provided in the rooms had shelves and drawers from the floor at a height of minimum of 2 feet	5	8.33	18	30	37	61.67	60	100
Wardrobe with sliding doors	17	28.33	0	0	43	71.67	60	100
3 feet 6 inches minimum clearance space at side or foot of a bed for dressing	1	1.67	10	16.67	49	81.67	60	100
4 feet 7 inches minimum height for provision of cloth rail from the floor	42	70	17	28.33	1	1.67	60	100
2 feet 6 inches clearance for major circulation path from the door to the closet	1	1.67	33	55	26	43.33	60	100
3 feet 6 inches limited space to open the closet door and remove garments	2	3.33	11	18.33	47	78.33	60	100
Provision of direct access from the bed to the bathroom	37	61.67	9	15	14	23.33	60	100
Provision of windows to view outside even for a bed ridden person	5	8.33	47	78.33	8	13.33	60	100
Provision of bedtable	31	51.67	0	0	29	48.33	60	100
Provision of buzzer	0	0	0	0	60	100	60	100
Provision of space to perform various activities	4	6.67	37	61.67	19	31.67	60	100
Direct accessibility between sleeping and dressing area	58	96.67	2	3.33	0	0	60	100
Indirect accessibility between food preparation and storage utility	55	91.67	5	8.33	0	0	60	100

Majority of the bedrooms had both direct and indirect accessibility to various rooms as per the guidelines. Sixty per cent of the bedrooms had a provision to perform various activities. No bedroom was provided with buzzer as per the recommended guidelines. More than half of the bedrooms were provided with bedtable at side or sides of the bed.

3.2 Relationship between Existing Bedroom and Family Income of the Elderly People

Analysis of variance (ANOVA) was carried out to test the null hypothesis stated below.

3.2.1 H_0 1 there exists no significant relationship between the existing bedroom and family income

The respondents were divided into five groups based on their income. Families earning between Rs. 18,953 and 31,598 were grouped as Low-income group, families with income range between Rs. 31,591 and 47,262 were grouped as Lower middle- income group, families earning between Rs. 47,266 and 63,178 were grouped as Middle- income group, similarly, families with income in between Rs. 63,182 and 126356 were grouped as Upper middle- income group and families with income above Rs.1,26,360 were grouped as Upper- income group.

Significant variation across the income groups was found concerning the adoption of recommended design guidelines in the bedroom.

Significant variance (F=0.0329) was found in the design of bedroom in the houses of the elderly with different income. The t-test was used to compare the means of different categories of families based on Income. The results are presented in Tables 2,3.

The Significant mean difference regarding the design of bedroom as per standard design guidelines was found between families belonged to:

(i) Low-income group and upper- income group
(ii) Lower middle- income group and upper middle- income group
(iii) Lower middle- income group and upper- income group.

The prominent difference in the design of bedroom was found between families that had relatively more difference in family Income. Slight changes in income level had not shown any difference in the design of bedroom.

Respondents with

(i) Low- income group differed significantly with upper- income group
(ii) Lower middle income group differed with upper middle- income group and
(iii) Upper -income group in the adoption of standard design guidelines in designing bedroom.

Hence, the null hypothesis was rejected in case of the design of bedroom in elderly housing.

3.3 Relationship between Existing Bedroom and Type of House of the Elderly People

Analysis of variance (ANOVA) was carried out to test the null hypothesis stated below.

3.3.1 H_0 2 there exists no significant relationship between the existing bedroom and type of the house

The house in which the residents are staying at the time of data collection was considered as a type of house in the study. The scoring was given for various types of the house of the respondents. Score 1 was given for independent house, score 2 was given for independent double storied house, score 3 was given for apartment or flat and score 4 was given for duplex respectively.

Table 2. Analysis of variation between the existing bedroom concerning family income

Existing housing condition	Family Income in Rupees	N	Mean	Std	F-Value
Bedroom	Low -income group	4	34.00	4.97	0.0329*
	Lower middle- income group	13	34.85	3.29	
	Middle- income group	20	38.10	5.38	
	Upper middle- income group	21	38.33	4.83	
	Upper- income group	2	44.50	6.36	

*Note: * Significant 'F' value*

Table 3. Differences between mean scores of design of bedroom by family income

Existing housing condition	Family Income comparison	Mean difference	t-value	Significance
Bedroom	Low- income group Vs. Lower middle – income group	2.74	-0.31	ns
	Low- income group Vs. Middle –income group	2.62	-1.56	ns
	Low- income group Vs. Upper middle – income group	2.61	-1.66	ns
	Low- income group Vs. Upper- income group	4.15	-2.53	*
	Lower middle- income group Vs. Middle- income group	1.71	-1.91	ns
	Lower middle- income group Vs. Upper middle- income group	1.69	-2.06	*
	Lower middle- income group Vs. Upper- income group	3.64	-2.65	*
	Middle- income group Vs. Upper middle- income group	1.50	-0.16	ns
	Middle- income group Vs. Upper- income group	3.55	-1.80	ns
	Upper middle- income group Vs.. Upper- income group	3.54	-1.74	ns

Table 4. Analysis of variation in the existing bedroom concerning the type of the house

Existing housing conditions	Type of house	N	Mean	Std	F-Value
Bedroom	Independent house	23	35.91	5.39	0.0001*
	Independent double storied house	15	35.00	2.39	
	Apartment/flat	18	39.28	2.24	
	Duplex	4	46.75	7.41	

*Note: * Significant 'F' value*

Significant variation was found between respondents with different types of the house and the existing design of the bedroom.

Significant variance (F=0.0001) was found in the design of bedroom among different types of houses. The t-test was used to compare the mean difference between different types of houses concerning the design of bedroom. The results are presented in Tables 4,5.

The Significant mean difference regarding the design of bedroom as per standard design guidelines was found between in all the types of houses except independent house and the independent double storied house.

Respondents with

(i) Independent house differed significantly with apartment /flat and duplex
(ii) Independent double storied house differed significantly with apartment/flat and duplex and

(iii) Apartment/Flat differed significantly with duplex in the adoption of standard design guidelines in designing Bedroom.

Hence, the null hypothesis is rejected in case of bedroom design in elderly housing.

The standard design guidelines related to bedroom design such as height for placement of bed surface from the floor, minimum clearance between beds, between twin bed and wall for ease of bed making, space for cleaning from bed to wall, wardrobe with sliding doors, the minimum height for provision of cloth rail from the floor, provision of space to perform various activities, direct accessibility between sleeping and dressing area and indirect accessibility between food preparation and storage utility were met in relatively large bed rooms. Size of the bedroom depended on the type of house and size of the bedroom was the deciding variable in meeting the required design guidelines related to bedroom design.

Table 5. Differences between mean scores of design of bedroom by type of house

Existing housing condition	Type of house comparison	Mean difference	t-value	Significance
Bedroom	Independent house Vs. Independent double storied house	0.91	0.66	ns
	Independent house Vs. Apartment /Flat	-3.36	-2.57	*
	Independent house Vs. Duplex	-10.84	-4.81	**
	Independent double storied house Vs. Apartment/Flat	-4.28	-2.94	**
	Independent double storied house Vs. Duplex	-11.75	-5.02	**
	Apartment/Flat Vs. Duplex	-7.47	-3.25	**

Table 6. Percentage contribution of variables towards the design of the existing bedroom

Existing housing condition	Variable	Estimate	StdErr	T value	Pr> |t|	Contribution of Sum of squares%	Rank
Bedroom	Type of the house	2.05	0.61	3.36	0.00	46.86	1
	Family monthly Income	0.21	0.26	0.80	0.43	27.51	2
	Occupation	-0.52	0.47	-1.10	0.28	13.11	3
	Socio Economic status	1.62	0.93	1.74	0.09	10.66	4
	Ownership of the house	-0.89	1.64	-0.54	0.59	0.94	5
	Age of the house	0.52	1.24	0.42	0.68	0.54	6
	Education	0.19	0.70	0.27	0.79	0.39	7

3.4 Percentage Contribution of Independent Variables towards the Design of the Existing Bedroom

Regression analysis was performed to estimate the contribution of selected variables viz.

(i) Family monthly income
(ii) Type of house and other variables towards the existing bedroom of the elderly.

The contribution of type of the house and the family monthly income in the design of the bedroom was up to 46.86% and 27.51% respectively. The contribution of the type of the house alone was nearly fifty per cent. The results are presented in Table 6.

The major variable that contributed to designing a bedroom as per the design guidelines was the 'Type of the house'. Probably the independent large houses had bedrooms with clearance spaces between beds, space for bed making, space for a least used side of the bed as per the recommended guidelines. Bedrooms in these independent houses had both direct and indirect accessibility to various rooms as per the guidelines with provisions to perform various activities.

The contribution of the occupation of the respondent was only 13.11% it was ranked at 3. Knowledge due to their education and exposure might have helped the families to plan bedrooms in such a way that they make their living throughout their life comfortable.

4. CONCLUSION

The clearance space for making the bed, for movement around the bed, for making use of space on one side of the bed was found to be satisfactory in slightly more than half of the study sample. Electrical fittings and provisions for storage were found suitable in fifty per cent of the

houses. None of the bedrooms were provided with alarm and security systems the major variables that contributed in designing a bedroom as per the design guidelines was the 'Type of the house' and 'Family Income' of the elderly people.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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