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Ergonomic assessment of houses for elderly people in Radhanpur city, Patan district

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Abstract

The proportion of elderly around the world has increased rapidly in recent years and is projected to accelerate in the next few decades. Therefore, it is important for all countries to promote healthy ageing and help the elderly to maintain their functional abilities to meet their basic needs such as making decisions, being mobile, living in healthy and safe environment, maintaining relationships and contributing to society. Present study was conducted in Radhanpur city of Patan district of Gujarat and aimed at assessing houses for elderly people. A representative sample of 120 people was selected randomly from twelve societies. Personal and socio-economic characteristics were studied as independent variables, risk for health and safety and problems faced by elderly people related to housing environment were studied as the dependent variable. An interview schedule was formed which comprised questions related to background information, personal and socio-economic variables and type of activities performed by elderly people. Data were collected by personal interview technique. Descriptive type statistical tools analysis was done by calculating percentage, frequency, mean, 5th percentile and 95th percentile.

Keywords: Decisions, being mobile, such as making

Introduction

According to data from World Population Prospects (2015), the proportion of elderly around the world has increased rapidly in recent years and is projected to accelerate in the next few decades. Between 2015 and 2030, the number of people worldwide aged 60 years or over is projected to grow from 901 million to 1.4 billion. This demographic shift started in high-income countries, for example, Japan and France, and now the low- and middle-income countries are undergoing this change. It is predicted that by 2050, 80 per cent of the elderly will be living in low- and middle-income countries. This shift challenges low- and middle-income countries to ensure their social and health systems readiness for the growing numbers of elderly. Therefore, it is important for all countries to promote healthy ageing and help the elderly for maintaining their functional abilities and meeting their basic needs such as making decisions, being mobile, living in healthy and safe environment, maintaining relationships and contributing to society. The basic needs also include financial security, personal security and safety, health care and health challenges, mental health and self-actualization. Considering these points, present research work was proposed entitled "Ergonomic assessment of houses for elderly people in Radhanpur city, Patan District" with the following objectives:

Objectives of the study

1. To study the personal and socio-economic characteristics of respondents
2. To identify risk factors and problems faced by respondents related to housing environment
3. To collect anthropometric measurements of respondents
4. To ergonomically evaluate residences of respondents
5. To suggest ergonomics interventions for residences of respondents

Research Methodology

Present study was carried out to assess the residences of elderly people ergonomically in Radhanpur city of Patan district. Multistage random sampling was used for selection of respondents. There are 57 societies in Radhanpur City. Out of these, twelve societies were selected randomly. From each society, ten respondents were randomly selected. Hence, total sample size was 120 elderly people belong to the age group of 65 years and above.

A list of people aged 65 years and above was collected from collector office. Personal and socio-Economic characteristics of elderly people were studied as independent variables like age, gender, education, caste, religion, marital status, family structure, income of family, occupation of family, size of family, types of vehicles, and types of household equipment. Risk for health and safety and problems faced by elderly people related to housing environment was studied as the dependent variable.

Review of Literature

An in-depth review of literature is an essential part of any scientific investigation. It helps to know the previous research trends in the study area, to systematically organize the existing research and to identify the future research avenues. This chapter deals with the brief account of literature reviewed and is presented under the following headings:

A Swedish study suggests home means security and safety as well as freedom for older adults. (Dahlin-Ivanof *et al.*, 2007) [2] Rao (2019) [4] indicated that bathroom was identified as the most unsafe area in the home of elderly people. Thirty-one per cent elderly people had a fall/slip due to the physical environment in the last one year. Most common hazards in the homes of elderly people were poor illumination, level changes in flooring and slippery flooring.

Forlizzi *et al.* (2004) [3] showed in their findings that many aspects of a typical senior's apartment fail to fulfil the residents' needs properly. For example, the bathrooms and kitchens had some inadequacies that can limit the daily activities of the older persons. These inadequacies included the storage of unnecessary appliances and food on kitchen countertops and the positioning of cabinets and shelves out of reach for residents.

Perkins (2013) [5] stated that buildings for elderly were not meeting the standards for high quality apartments and meeting their diverse needs. Therefore, we should focus on the architectural design and sustainable technology applications

of the senior housing research.

Carter *et al.* (2000) [1] analysed that door, 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.

The study conducted by Unesha and Neeraja (2020) [6] aimed to know the factors contributing to the design of a bedroom in elderly housing. 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.

Zhang (2019) [7] focused on the design of residential buildings for the elderly in the context of an aging society. Proceeding from the actual problems of the elderly, discussing the physical and psychological problems, the author analysed the problems in the design process and the principles to be followed, and finally proposed measures to improve the design level.

Review of literature highlighted that many residences of elderly were not as per their requirement. Anthropometric measurements and need of elderly should be considered while designing houses for elderly.

Results and Discussion

Personal and socio-economic characteristics of elderly people

In the present investigation, the personal and socio-economic characteristics of elderly people are studied and depicted in Table 1 which includes age, gender, educational qualification, religion, caste, family structure, family size, occupation, types of houses, monthly family income, type of vehicle and type of household equipment.

Table 1: Distribution of respondents on the basis of personal and socio-economic characteristic

Sr. No.	Age (years)	f	%
1	<70	81	67.5
2	70-90	38	31.7
3	>90	01	00.8
	Total	120	100.0
Sr. No.	Education	f	%
1	Primary level	101	84.2
2	High school level	016	13.3
3	Intermediate level	002	01.7
4	Graduation	001	00.8
5	Post graduate	000	000
	Total	120	100.0
Sr. No.	Religion	f	%
1	Hindu	114	95.0
2	Muslim	006	05.0
	Total	120	100.0
Sr. No.	Caste	f	%
1	General	42	35.0
2	OBC (Other backward caste)	64	53.3
3	SC	12	10.0
4	ST	02	01.7
	Total	120	100.0
Sr. No.	Family structure	f	%
1	Joint family	88	73.3
2	Extended family	00	000
3	Living without children	32	26.7
4	Nuclear family	00	000

	Total	120	100.0
Sr. No.	Family size	f	%
1	Small (up to 4 members)	57	47.5
2	Medium (5-8 members)	58	48.3
3	Large (above 8 members)	05	04.2
	Total	120	100.0
Sr. No.	Occupation	f	%
1	Business	84	70.0
2	Govt. Job	14	11.7
3	Service (other than government sector)	11	09.2
4	Farming	09	07.5
5	Business+ Farming	02	01.7
	Total	120	100.0
Sr. No.	Type of house	f	%
1	Row house	68	56.7
2	Detached house	41	34.2
3	Semi Detached house	11	09.2
	Total	120	100.0
Sr. No.	Family monthly income (₹)	f	%
1	Below 10,000	01	00.8
2	10,000-25,000	15	12.5
3	25,000-40,000	62	51.7
4	40,000-65,000	38	31.7
5	65,000-80,000	04	03.3
	Total	120	100.0
Sr. No.	Type of vehicle	f	%
1	Two-wheeler	39	32.5
2	Four-wheeler	00	00.0
3	Both (Two-wheeler + Four-wheeler)	72	60.0
4	None	09	07.5
	Total	120	100.0
Sr. No.	Household equipment	f	%
1	Television + Refrigerator	03	02.5
2	Television + Refrigerator + Washing machine	02	01.7
3	Television + Refrigerator + Washing machine + Ghar ghantee	01	00.8
4	Television +Refrigerator + Washing machine +Air conditioner	06	05.0
5	Television +Refrigerator + Ghar ghantee	02	01.7
6	Television + Refrigerator + Ghar ghantee + Air conditioner	03	02.5
7	Television + Refrigerator + Air conditioner	05	04.2
8	All	98	81.6
	Total	120	100.0

f = Frequency % = Percentage n = Sample size

The results of the personal and socio-economic characteristics of respondents under study revealed that about sixty-eight per cent respondents were below the age of 70 years followed by 70-90 years (31.7%) and negligible proportion of respondents (0.8%) were in the age of above 90 years.

All the respondents of study were female.

According to the present investigation majority of the

respondents had primary level education (84.2%), 13.3 per cent had high school education and only 0.8 per cent respondents had completed graduation. No one was post graduate.

Majority of the respondents (95.0%) belonged to the Hindu religion while only 5.0 per cent of respondents were Muslim.

Table 2: Assessment of bedroom of elderly

Features	Yes		No	
	f	%	f	%
Lamp or flashlight kept within reach of bed	094	78.3	26	21.7
Night light or lamp kept within reach of bed	117	97.5	03	02.5
Place for keeping important items near bed	114	95.0	06	05.0
Bed's corner seems sharp	108	90.0	12	10.0
Use of artificial lighting in daytime	072	60.0	48	40.0
Ventilation is proper	115	95.8	05	04.2
Door is easy to open or close	120	100.0	00	00.0
Door knobs are easy to operate	114	95.0	06	05.0
Cupboards at proper height	109	90.8	11	09.2
Total	120	100.0	120	100.0

f = Frequency % = Percentage n = Sample size

Caste is an important feature of the social structure, and it was taken as a variable. Caste wise distribution of respondents as emerged from the present study (Table 1) illustrates that maximum respondents (53.3%) belonged to OBC (Other Backward Class) category followed by general category (35.0%) and SC (Schedule Caste) category (10.0%). Very few respondents (1.7%) belonged to ST (Schedule Tribe) category.

The family structures were categorized as joint, extended, living without children and nuclear family. It was found that 73.3 per cent respondents were from joint family and 26.7 per cent respondents were living without children. Extended families were obsolete from the data.

The analysis of data related to family size shows that maximum respondents (48.3%) belonged to the medium-size family followed by small-size family (47.5%) and only few (4.2%) had large size family. The findings lead to the conclusion that respondents preferred to have small or medium size family.

It is evident from the analysis that occupation of majority (70.0%) of the respondents was business, while 11.7 per cent of respondents were government employees. Nine per cent respondents were doing service in other sectors and a few (7.5%) respondents were doing farming also. The findings illustrate that respondents were mostly belonged to business community.

The analysis of data related to type of house shows that maximum respondents (56.7%) belonged to the row house followed by detached houses (34.2%) and very few (9.2%) possessed the semi-detached house.

Monthly income of the respondents' family was classified into four categories of income group. Little more than half of the respondents (51.7%) were obtaining ₹25,000-₹40,000 monthly family income followed by 31.7 per cent who were getting ₹40,000-₹65,000 monthly family income. Only 3.3 per cent respondents belonged to the income group of ₹65,000-₹80,000 family monthly income. The finding leads to the conclusion that monthly family income of majority of the respondents was more than ₹25,000 income per month.

The types of vehicles possessed by majority of the respondents (60%) were both two-wheeler and four wheeler. While 32.5 per cent respondents had only two-wheeler and 7.5 per cent respondents did not have any type of vehicle.

Majority of the respondents (81.6%) owned all major household equipment such as television, refrigerator, washing machine, air conditioner and ghar ghanti.

Ergonomic assessment of bedroom reflected that lamp or flashlight was kept within reach of bed in the bedroom of majority of the respondents (78.3%). Likewise, majority of respondents (97.5%) reported that the night lamp was within reach of their bed and ninety-five per cent stated that they had place near bed to keep their important belongings such as medicines, spectacles etc.

Ninety per cent respondents admitted that the bed corners were sharp. It might be hazardous for them. Sixty per cent respondents were using artificial light in daytime which reflects that sunlight was not proper in their bedroom due to poor orientation. Bedroom was properly ventilated in houses of majority of respondents (95.8%). All the respondents stated that their door is easy to operate and doorknobs were also easy to operate in majority of respondents' bedroom. Almost ninety-one per cent stated that the cupboards were at proper heights in their bedroom.

Overall, it can be concluded that majority of respondents had ergonomically suitable features in their bedroom.

Table 3: Distribution of respondents according to convenience of bed

Bed is comfortable	f	%
Comfortable	97	80.8
Not comfortable	14	11.7
More high	03	02.5
Less high	06	05.0
Total	120	100.0
<i>f</i> = Frequency % = Percentage n = Sample size		

Almost eighty-one per cent respondents reported that their bed was comfortable while about 12 per cent stated that it was not comfortable.

Table 4: Location of switchboard in bedroom

Location of Switch board	f	%
Near entrance	79	65.8
Near bedside	25	20.8
Far from entrance and bed	16	13.3
Total	120	100.0
<i>f</i> = Frequency % = Percentage n = Sample size		

Location of switch board was found near the entrance in the bedroom of 65.8 per cent respondents followed by near bedside in the bedroom of 20.8 per cent respondents. It was far from the entrance and bed in bedroom of only 13.3 per cent respondents. Rao (2019)^[4] stated that light switches must be placed near the entrance to the room and at the same side of the door handle.

Table 5: Source of ventilation in bedroom

Source of ventilation	f	%
Ventilator	000	000
Windows	119	99.2
Exhaust fan	001	00.8
Total	120	100.0
<i>f</i> = Frequency % = Percentage n = Sample size		

Windows were found the main and only source of ventilation in the bedroom of respondents.

Table 6: Assessment of living room

Features	Yes		No	
	f	%	f	%
Chairs and sofas are comfortable	111	92.5	09	7.5
Light switch is located near the entrance	113	94.2	07	5.8
Proper ventilation in living room	115	95.8	05	4.2
Total	120	100.0	120	100.0
<i>f</i> = Frequency % = Percentage n = Sample size				

Table 6 shows chairs and sofas were comfortable in houses of 92.5 per cent while 7.5 per cent respondents reported that these were not comfortable. Lighting switch was located near entrance in the living room of 94.2 per cent respondents and far from the entrance in the living room of 5.8 per cent respondents. Proper ventilation in living room was found in living room of 95.8 per cent respondents.

Table 7: Proper place for movement in the living room

Place of movement	<i>f</i>	%
Sufficient	96	80.0
Not Sufficient	24	20.0
Total	120	100.0
<i>f</i> = Frequency % = Percentage <i>n</i> = Sample size		

Eighty per cent respondents reported that there was sufficient place of movement in their living room after furniture arrangement. There was insufficient space for movements in living room of 20 per cent respondents.

Table 8: Assessment of kitchen

Kitchen features	Yes		No	
	<i>f</i>	%	<i>f</i>	%
Sink areas have adequate light levels	070	58.3	50	41.7
Cabinets are not too high to be easily reached	110	91.7	10	08.3
Lighting is proper at the area of meal preparation	091	75.8	29	24.2
Light switches are located near the door	112	93.3	08	06.7
Flooring is not slippery	102	85.0	18	15.0
Drawers and cupboards are easy to operate	098	81.7	22	18.3
Proper length of kitchen platform	114	95.0	06	05.0
Proper width in kitchen platform	110	91.7	10	08.3
Proper height in kitchen platform	118	98.3	02	01.7
Total	120	100.0	120	100.0
<i>f</i> = Frequency % = Percentage <i>n</i> = Sample size				

Table 7 illustrates that the sink area had adequate light levels in kitchen of 58.3 per cent respondents while it was not proper in the kitchen of 41.7 per cent respondents. Kitchen wall cabinets were reported easily accessible by majority of the respondents (91.7%) and lighting was enough at meal preparation counter in the kitchen of almost three-fourth of the respondents while it was not enough for one-fourth of the respondents. Lighting switch was located near the door in residences of 93.3 per cent respondents.

Kitchen flooring was not slippery, and surface was non-glare in residences of 85 per cent respondents. Drawers and cupboards were found easy to operate by 81.7 per cent respondents while 18.3 per cent respondents reported that it was not easy to operate.

Kitchen platform length, width and height were reported proper by majority of the respondents i.e., 95 per cent, 91.7 per cent and 98.3 per cent respectively.

Table 9: Details of Kitchen

Shape of kitchen	<i>f</i>	%
L-Shape	85	70.8
U-Shape	34	28.3
Parallel	01	00.8
Total	120	100.0
Source of ventilation in kitchen	<i>f</i>	%
Chimney	001	00.8
Exhaust fan	001	00.8
Windows	117	97.5
None	001	00.8
Total	120	100.0
Place of sink	<i>f</i>	%
In the corner	76	63.3
In the middle	44	36.7
Total	120	100.0
Location of drawers and cupboards	<i>f</i>	%
Within maximum horizontal reach	15	12.5
With maximum vertical reach	13	10.8
Near cooking place	92	76.6
Total	120	100.0
Accessibility of frequently used things	<i>f</i>	%
Too low	03	02.5
Too high	19	15.8
Too deep	01	00.8
At proper place	97	80.8
Total	120	100.0
<i>f</i> = Frequency % = Percentage <i>n</i> = Sample size		

Table 8 shows that maximum almost seventy-one per cent respondents owned L-shape kitchen followed by U shape (28.3%). Source of ventilation was window in the kitchen of

97.5 per cent respondents. They had not installed chimney or exhaust fan except one respondent each. Place of sink in the kitchen of maximum respondents (63.3%) was in the corner

of platform. It is easy to operate if the sink is at the corner. It creates obstruction if it is in middle of the platform. Location of the drawers and cupboards were found near cooking place in the kitchen of 76.6 per cent respondents. Majority of the

respondents i.e., 80.8 per cent reported that the frequently used things in the kitchen were at proper place for easy accessibility.

Table 10: Posture during work at kitchen platform

Posture during work at kitchen platform	f	%
Bending	000	000
Standing	112	93.3
Stooping	000	000
Squatting	000	000
Sitting	008	06.6
Total	120	100.0

f= Frequency % = Percentage n = Sample size

Standing posture was common and about ninety-three per cent respondents were using standing posture while working at kitchen platform.

Table 11: Difficulty in meal preparation

Difficulty during meal preparation	f	%
Yes	81	67.5
No	29	24.2
Sometimes	10	08.3
Total	120	100.0
Type of difficulties	f	%
Cut due to sharp knife	04	03.3
Not able to control hand movement properly	33	27.5
Insufficient lighting	17	14.2
No space for sitting in the kitchen	23	19.2
Insufficient lighting + Cut due to sharp knife	04	03.4
Any other	10	08.3
None	29	24.2
Total	120	100.0

f= Frequency % = Percentage n = Sample size

Maximum respondents i.e., 67.5 per cent reported difficulty in meal preparation such as cutting vegetables and fruits. It was majorly due to improper control of hand movement (27.5%), improper space of sitting in kitchen (19.2%) and insufficient lighting (14.2%).

Table 12: Bathroom and toilets features

Features	Yes		No	
	f	%	f	%
Low pile rugs at the entrance	105	87.5	015	12.5
Lighting without shine	114	95.0	006	05.0
Light switch is near the door	109	90.8	011	09.2
Bathroom door opens outward	076	63.3	044	36.7
Ventilation is proper in bathroom	088	73.3	032	26.7
Floor of bathroom is non-slippery	097	80.8	023	19.2
Proper size sitting stool is available in bathroom	115	95.8	005	04.2
Comfortable taking soap, shampoo in bathroom	118	98.3	002	01.7
Grab bars are available	000	000	120	100.0
Size of the bathroom is proper	086	71.6	034	28.3
Door latches is accessible	092	76.6	028	23.3

f= Frequency % = Percentage n = Sample size

The Table 11 gives a glimpse of ergonomic assessment of bathrooms and toilets of elderly. Non-skid and low pile rugs were found at the entrance of bathroom in the residences of majority (87.5%) of the respondents. There was even lighting without shine in bathrooms of majority (95.0%) of the respondents and lighting switch was also found near the door

(90.8%). The bathroom door was opening outward in houses of above sixty per cent respondents while 36.7 per cent denied about it. Ventilation was found proper in bathroom of about 73 per cent the respondents while it was not proper in bathroom of more than one-fourth of respondents (26.7%). Bathroom floor was non-slippery in houses of majority (80.8%) of the respondents. Sitting stool of proper size was available in the bathroom of majority (95.8%) of respondents and the maximum (98.3%) respondents reported that they could comfortably take soap shampoo and any items in bathroom. Garb bars were not available in bathroom of house of elderly people, which should be a necessary feature especially for bathroom of elderly. Size of bathroom was reported proper by almost seventy-two per cent respondents and door latches were also accessible in the bathrooms of about seventy-seven respondents. The findings of present study are similar to Rao (2019) [4] which reported that elderly preferred the simple traditional latch and door handles, which did not match to the decor of their houses.

Table 13: Location of bathroom

Bathroom location	f	%
Near the room	70	58.3
Far from the room to go	15	12.5
Attached to room	35	29.2
Total	120	100.0
Bathroom-toilet attachment	f	%
Unattached to toilet	004	03.3
Attached western toilet	101	84.2
Attached Indian toilet	009	07.5
Attached Western and Indian toilet	006	05.0
Total	120	100.0

f= Frequency % = Percentage n = Sample size

Location of bathroom was asked from the respondents. Only twenty-nine per cent respondents had attached bathroom to their room while 12.5 per cent respondents had to go far from the room to use bathroom. More than half i.e., 58.3 per cent stated that their bathroom location was near their room though not attached. Further, it was found that majority of the respondents (84.2%) got installed western toilet which is convenient to use by elderly due to joint pain and other health related problems.

The Table 13 shows the problem faced by respondents while using bathroom and toilets in their houses. Respondents faced difficulty while seating and standing in toilets (78.3%) while 21.7 per cent reported that they did not face any difficulty. Type of problem cited by maximum respondents was leg pain (42.5%) followed by knee pain (13.3%) of respondents.

Table 14: Difficulty while using toilet

Difficulty while using bathroom and toilet	f	%
Yes	94	78.3
No	26	21.7
Total	120	100.0
Type of problem	f	%
Leg pain	51	42.5
Back pain	09	07.5
Hand pain	00	000
Palm pain	00	000
Knee pain	16	13.3
Shoulder pain	01	00.8
Elbow pain	00	000
Foot pain	01	00.8
Leg pain + Back pain	04	03.3
Leg pain + knee pain	05	04.2
Leg pain + knee pain+ Hand pain	04	03.3
Hand pain + Elbow pain+ Leg pain+ Back pain	01	00.8
knee pain + Back pain	001	00.8
knee pain + Hand pain + Palm pain	001	00.8
None	026	21.7
Total	120	100.0
f= Frequency % = Percentage n = Sample size		

Table 15: Stairs and related problems faced by elderly

Material used on flooring of stairs	f	%
Tiles	54	45.0
Stone	50	41.7
Cement	06	05.0
Any other	10	08.3
Total	120	100.0
Difficulty to climbing stair	f	%
Yes	93	77.5
No	27	22.5
Total	120	100.0
If yes, which type of problem	f	%
Knee pain	34	28.3
Leg pain	38	31.7
Leg slipping	09	07.5
Sharp stair	01	00.8
Very high stair	04	03.3
Hand pain	01	00.8
Knee pain+ Leg pain	05	0 4.1
Knee pain+ Leg pain+ Leg slipping	01	00.8
None	27	22.5
Total	120	100.0
f= Frequency % = Percentage n = Sample size		

Tiles and stone were found the most popular material for flooring on stairs. These materials may be more slippery and hazardous for elderly. Further, majority of the respondents

(77.5%) used to feel difficulty while climbing stairs. Major problems faced by respondents while climbing the stairs were leg pain (31.7%) and (28.3%) knee pain.

Table 16: Flooring and accidents in house

Materials used in flooring	f	%
Tiles	104	86.7
Stone	015	12.5
Cement	001	00.8
Total	120	100.0
Accident at home	f	%
Yes	112	93.3
No	008	06.7
Total	120	100.0
Which type of accidents	f	%
Cut	11	09.2
Injuries	22	18.3

Fall	66	55.0
Strain	04	03.3
Sprain	03	02.5
Cut+ Injuries	03	02.5
Cut+ Injuries+ Fall	01	00.8
Injuries+ Fall	02	01.7
Never	08	06.7
Total	120	100.0
$f =$ Frequency % = Percentage $n =$ Sample size		

Tiles were found the most popular flooring material in the house of maximum (86.7%) respondents. It is important to pay heed on it that about ninety-three per cent respondents ever had an accident at home. Fall was reported by maximum respondents (55.0%). Injuries (18.3%) and cut (9.2%) were also reported by a few respondents. Fall may be due to poor design features and slippery floor in house. Sometimes, fall may be fatal or serious. Hence, it is necessary to use anti slippery floor for elderly.

Conclusion

The present research was conducted to ergonomically evaluate houses of elderly people and problems faced by them. It can be concluded that all the elderly except one were suffering from any kind of chronic disease. The results of the present research are pointer to the fact that elderly population need ergonomic interventions in their houses for easy accessibility and suitability for them. Sometimes, poor designing of houses may lead to accidents in houses. The results of study can be utilized for drawing policies regarding minimum housing standards for elderly.

References

1. Carter SE, Campbell EM, Sanson-Fisher RW, Gillespie WJ. Accidents in older people living at home: A community-based study assessing prevalence, type, location and injuries, Australian and New Zealand Journal of Public Health. 2000;24(6):633-636.
2. Dahlin-Ivanof S, Haak M, Fange A, Iwarsson S. The multiple meaning of home as experienced by very old Swedish people. Scandinavian Journal of Occupational Therapy. 2007;14(1):25-32.
3. Forlizzi J, DiSalvo C, Gemperle F. Assistive robotics and an ecology of elders living independently in their homes. Human-Computer Interaction. 2004;19(1-2):25-59.
4. Rao R. Ergonomic Evaluation of the residence (private areas) of the Elderly. International journal of Multidisciplinary Educational Research. 2019;8(6):2277-7881.
5. Perkins LB. Building type basics for senior living (Second ed.) Hoboken: Wiley. c2013, p. 11-14.
6. Unesha Fareq R, Neeraja T. Determinants of Bedroom Design in Elderly Housing. Current Journal of Applied Science and Technology. 2020;39(48):162-168.
7. Zhang W. Perceptions of elder abuse and neglect by older Chinese immigrants in Canada. Journal of Elder Abuse & Neglect. 2019;31(4-5):340-362.