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Original Research Article

Study of the availability of home modifications in paraplegics

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ABSTRACT

Background: Paraplegia is loss of motor strength, sensations and bowel bladder function below the level of injury due to spinal cord damage. Spinal cord injury is medically managed along with rehabilitation which includes muscle strengthening, and mobility in a wheelchair with proper training and home modification. The paraplegic population is the most demoted section of our society and is confronted with barriers to accessibility, health facilities, educational opportunities, and skill development. Accessibility is very important for the paraplegic population and lack of accessibility may affect their abilities in self-care and employment so our objective was to find out modifications done in the house of paraplegics, compartmentalize and standardize various modifications done.
Methods: The study setting and design was done at tertiary care centre, community setting and observational study. The sample size was 40. Inclusion was of both genders, sub-acute to chronic phase spinal cord injury and wheelchair users was taken. Exclusion was quadriplegics and bedridden patient's spinal cord injury individual.
Results: The statistical analysis was done by using SPSS V 26 software. The mean and standard deviation were calculated. In this study, the mean average modification shows in the ascending order of the entrance and exits (69.5%), followed by the hall (64.30%), bedroom (60%) bathroom (60%) and the kitchen (37.5%).
Conclusions: The study concluded that most of the spinal cord injury individuals modify their houses. Entrance, exits and followed by the hall were most modified and the kitchen was the least modified compartment in the house.

Keywords: Availability, Home modifications, Spinal cord injury, Wheelchair users

INTRODUCTION

Spinal cord injury is a low-incidence, high cost injury that results in tremendous change in an individual's life.[1] Paraplegia is loss of motor strength and sensations in the lower half of the body due to spinal cord injury and quadriplegia is the worst situation where it involves all the extremities. Home modifications mean that the home environment can be modified according to the needs of the paraplegic population by including wheelchair-accessible doors, ramps and rails, tub seats in the bathroom and non-slip surfaces.[1]

The common causes of spinal cord injury are trauma, road traffic accidents, gunshot injury, falls and diseases like spina bifida, poliomyelitis and other diseases.[2] The spinal cord injury is medically managed along with rehabilitation which includes muscle strengthening, and mobility in a wheelchair with proper training and home modification.[3] The paraplegic population is the most demoted section of our society and is confronted with barriers to accessibility, health facilities, educational opportunities, and skill development. Accessibility is very important for the paraplegic population and lack of accessibility may affect their abilities in self-care and employment.[4]

Paraplegia can lead to limited and altered mobility, self-care and ability to participate in valued social activities the psychological impact of spinal cord injury can be just as great as the physical impact of changes in the body image, function, incontinence and having to rely on others to complete their everyday tasks that were previously done without thought or effort can profoundly influence a person.[1] Having a spinal cord injury means that your ability to move has changed and also increases a lot of physical strain.[5] The person might have to use a walker or may need to use a wheelchair to move from place to place. Transfers may be difficult or may need others to help them. Because of this, the home may need some changes so it is accessible.[6,7]

The house should be set up in a way that allows you to be as independent and functional as possible. Home modification can mean small changes, such as new handles that are easier to grip and turn. Or it may mean larger changes, such as installing a new entryway or remodeling the bathroom. The patients need to think about how to adapt their home to best suit their needs.[8]

Home modification is an important aspect of rehabilitation after spinal cord injury and plays an important role in free accessibility at home and the community with improvement in the quality of life of a person with disability.[9]

Objective of study was to find out modifications done in the house of paraplegics, compartmentalize and standardize various modifications done.

METHODS

An observational study design using purposive sampling was conducted. The study was carried out at Sancheti Hospital Pune, Maharashtra in the Month of November 2022 to June 2023 and the sample size was calculated by using a confidence interval method. A total sample size was 40 paraplegic individuals were included in the study and their home modifications. Out of which 30 were males and 10 were female participants. Inclusion was of both genders, sub-acute to chronic phase spinal cord injury and wheelchair users was taken. Exclusion was quadriplegics and bedridden patient's spinal cord injury individual.

The procedure was questionnaire including 5 compartments which were the entrance and exit of the house, hall, kitchen, bathroom and bedroom. The compartments included questions regarding the modifications such as ramps, easy access for the wheelchair, antiskid walkways and entryways, grab bars etc. The questionnaire was then given to subject experts (n=3) for content validity. To reduce bias, the questionnaire was pilot-tested on a small group of paraplegics (n=5) to review the questionnaire length and clarity of the questions.

It was then translated into Hindi and Marathi language by a language expert and further validated. A survey was conducted post approval from the institutional ethical committee. The participants were approached; the study was thoroughly explained which was going to be carried out, the relevance and future implications of the research. The subjects were added to the study based on voluntary participation. Informed written consent was given to each participant before the study. Self-administrated questionnaires were given to the subjects for them to fill up by themselves.

RESULTS

Total 40 paraplegics were recruited based on the inclusion criteria that was 10 females and 30 males. In this study, most significant changes were made in following ascending order the entrance and exits (69.5%) followed by the hall (64.30%), bedroom (60%) and bathroom (60%) and the kitchen (37.5%).

Table 1: Demographic data.

Characteristics	Values
Age (years)	42±2.1
Number of years post injury	11.4±11.6
Gender	F=10 M=30

Values of age, number of years post injury represents mean, standard deviation and gender represents total number of female (F) and male (M) subjects.

Table 2: Entrances and exits.

Modifications	% of modifications adapted by the subjects
Antiskid walkways and entryways	62.5
Ramps	65
Wheelchair accessible doorbell	55
38 inches wide doorway	85
Wheelchair accessible pathway	80

Table 3: Hall.

Modifications	% of modifications adapted by the subjects
Wheelchair accessible light switches	80
Electrical outlets 18 inches off the floor	62.5
Wheelchair accessible pathway in the hall	75
Furniture with sharp edges	40

Table 4: Bedroom.

Modifications	% of modification adapted by the subjects
Bed height 18 inches off the floor	70
Accessible switches along the bedside	55
Wheelchair accessible cupboard with shelves	57.5

Table 5: Kitchen.

Modifications	% of modifications adapted by the subjects
Easy access to gas and other appliances while seated	37.5
Easy access to shelves	30
Easy glide drawers	50
Wheelchair accessible sink	42.5
Wheelchair accessible table	27.5

Table 6: Bathroom.

Modifications	% modifications adapted by the subjects
Adjustable showerhead	65
Easy access to switches outside bathroom	70
Toilet seat 18 inches off the floor	75
Grab bars along the toilet seat	52.5
Grab bar near the shower or tap	45
Chair	80
Bright light	90
Antiskid floor	60
Full length mirror	2.8

DISCUSSION

In this study, the most significant changes were made in the entrance and exits (69.5%), followed by the hall (64.30%), bedroom (60%), bathroom (60%) and the kitchen (37.5%). This may suggest that the participant needs maximum assistance while entering and exiting the house and hence in most of the cases they were found to be modified. Wheelchair accessible doorbell was the least modified which was 55%. Antiskid walkways and ramps were modified by 62.5% and 65% respectively. Forty percent of the subjects were found to have furniture with sharp edges that were not made blunt post-injury. It is suggestive of an increased risk of getting injured while moving around the hall. It points out the need to make the sharp edges blunt.

The top five environmental barriers reported by subjects of spinal cord injury patients were the natural environment, transportation, need for help in the home, availability of health care and governmental policies according to Whiteneck et al.[10] This research helps us to emphasize how self-care becomes a barrier post-injury. The bathroom showed 60% of modifications done. This may be due to the highest risk of falls in the bathroom which requires assistive devices and modifications to various sections in the bathroom such as the addition of railings and increasing the height of the commode. 45% and 52.5% of the subjects showed installation of grab bars along the shower/tap and toilet seat respectively.

Instalment of grab bars is very important as it plays a vital role in providing stability while transferring from the wheelchair to the chair in the bathroom. Sixty percent of subjects had an antiskid floor in the bathroom this is also one of the most significant modifications which should be acquired in the bathroom. Considering the economic status of the patient they can either change the tiles or an antiskid rubber mat can be placed on the floor.

According to Petersson et al subjects who have received home modification reported less difficulty and increased safety, especially in tasks related to self-care in the bathroom and transfers such as getting in and out of the home. Seventy-five percent of the subjects have toilet seats 18 inches off the floor which is the ideal height for the toilet seat to provide easy transfer from the wheelchair to the seat without much physical effort. The least practiced modification of the bathroom was the instalment of the full-length mirror in the bathroom which was 2.8%. The need for a full-length mirror is only to get access to the whole body while the person is comfortably sitting on the wheelchair and be less dependent on the caregiver for grooming and basic activities like brushing, washing face etc.

Seventy percent of the subjects adjusted the height of the bed to the ideal height of the wheelchair which was 18 inches off the floor. Fifty-five of the subjects did not have easy access to the light switches and electrical outlets from the bedside hence making them more dependent on caregivers. This modification will help the patient reach out to the switches easily and will also reduce the physical work of getting onto a wheelchair to the switchboard.

In a study done by Silver et al, the most common categories of self-reported barriers were mobility and equipment issues (23%), and lack of environmental and home assistance (20%).[11] This study helps us to emphasize the need to do home modification and be more independent. The kitchen has been modified the least which was significant. This may suggest that paraplegics are dependent on their caretakers for their nutrition and diet. Easy glide drawers were found in 50% of paraplegic houses. This will help the patient to get easy access to kitchen cutleries without putting much effort. 42.5% of

subjects have modified their sink in such a way that the wheelchair can easily slide below the sink to get easy access to the tap. Besides cooking the whole meal, doing basic activities like boiling water, serving, making tea/coffee, washing utensils etc. should be able to be carried out by a paraplegic while being seated in a wheelchair although only 37.5% of subjects have easy access to the gas and other appliances.

Being unable to do basic self-care activities not only makes the patient feel disabled but also degrades the quality of life of the patient. Home modifications reported statistically significant improvement in their self-rated ability in everyday life according to Post et al.[12] When applied efficiently, this will help to improve the mobility, self-care and ability to participate in activities of daily living of the patients and make them more independent. It helps in decreasing the level of difficulty and increasing safety. It is very important to educate the paraplegic population coming to our clinics regarding home modifications and their importance and motivate them to be less dependent. The limitation of study was only taken paraplegic and not consider a quadriplegic patient.

CONCLUSION

The study concluded that most of the spinal cord injury individuals modify their houses. Entrance, exits and followed by the hall were most modified and the kitchen was the least modified compartment in the house and implication of this study will be important to educate the paraplegic population coming to our rehabilitation centre regarding the home modifications and its importance and motivate them to be less dependent.

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