DHARANA
International Journal of Business

https://doi.org/10.18311/DBIJB/2024/48290

An Analytical Study on Equipment and Facilities Satisfaction for Senior Citizens with Special Reference to Wheelchairs and Walkers

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Abstract

Persons with different abilities are dependent on wheelchairs and walkers. They face a lot of problems in their daily life which are associated with inconvenience. The study focuses on people using wheelchairs considering various factors such as comfort, training, ambulation, etc., which they come across using wheelchairs or walkers across age groups. The study narrows down a few dimensions concerning their safety, quality, ambulation, training, comfort and mobility. A survey was done with 113 respondents asking about their experience of using wheelchairs and walkers. The study tries to prove that there is a paramount requirement for training the people to use these mobility aids.

Keywords: **Ambulation, Comfort, Quality, Training, Walkers, Wheelchairs**

JEL Classification Code: I12, I31, J14, R41, O33

Cite this article as:

Sumithra Sreenath (2024). An Analytical Study on Equipment and Facilities Satisfaction for Senior Citizens with Special Reference to Wheelchairs and Walkers. *DHARANA - International Journal of Business, 15*(2), 53-61. doi:https://doi.org/10.18311/DBIJB/2024/48290

1. Introduction and Theoretical Background

In recent decades, the concept of disability has significantly influenced social phenomena. Therefore, it is a complex issue involving both the disabled person and society. In India, 2.21% of the total population is disabled. The highest prevalence is observed among senior citizens. The life of senior citizens in India is increasing rapidly. There are nearly 103 million senior citizens in India and is expected to grow to 300 million by 2050. Also, the growth rate of the disabilities is increasing rapidly. According to the census 2011, 17% of the differently abled are in the age group of 10-19 years, 16% of them belong to the age group of 20-29 years and 21% of them are elderly or senior citizens (60+ years). The reason for the growth of disabilities is due to the changes in the environment and food habits. Food consumption is not very hygienic and the availability of healthy food is limited. People from rural areas are more disabled because of the lack of hygiene, cleanliness and proper facilities. In urban areas, there is an increase in the use of electronic gadgets which indirectly harm the brain and health due to electronic radiation. Many children using electronic gadgets such as smartphones and tablets end up with a disability.

The Government of India has initiated many schemes for senior citizens and disabled people such as pension and healthcare schemes for senior citizens and education and employment opportunities for adults with disabilities. This study helps us understand the perception and experiences of senior citizens about the use of these facilities, especially wheelchairs and walkers. Wheelchairs and walkers are accessible forms of transportation that help them to move from one place to another.

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There are many types of wheelchairs, manual and electric. In recent times, smart wheelchairs have been considered over power wheelchairs. Power wheelchairs are traditional/ manual wheelchairs with battery chargeable or with power cables to plug into them. Normal wheelchairs lack the functionalities and safety features that Smart wheelchairs have. Continuous developments in the field of artificial intelligence and robotics have shaped the development of Smart wheelchairs. Smart wheelchairs consist of a remote control, which is responsible for the movements with the help of inputs from the sensors. A smart wheelchair can also be controlled manually by the user just like a normal electric-powered wheelchair. Electric wheelchairs are ideal for the elderly or senior citizens, who will have control over the chair which helps them be independent of others. Hence, it also helps in understanding the perception of these people, using the facilities for their benefit and also for the improvement of these equipment and facilities.

In addition to improving mobility, providing suitable wheelchairs starts the process of opening up a world of social, professional and educational opportunities. Apart from facilitating mobility, a suitable wheelchair enhances users' physical well-being and quality of life by assisting in the reduction of frequent issues including pressure sores, the advancement of deformities and better breathing and digestion.

Wheelchair interventions have created a drastic change in recent times for users. In the meantime, the usage of wheelchairs is not uncommon. Also, there is a huge scope in this field in the upcoming days because of global health factors that are affecting children, youngsters, middle-aged and senior citizens. Globally, there is a need to understand the cost-effectiveness of wheelchairs. The family and the disabled people should take into consideration the customization of wheelchairs. Low-quality products should be eliminated. Many innovations in the health sector have been happening. Also, in recent times, there has been a greater need for disabled equipment research so that disabled people feel more secure and respected.

Below mentioned are some of the schemes where the government has taken the initiative to help the public. Welfare is the main aim of the government and they should provide protection and safety for the disabled. There should be more health benefits given to them along with affordable prices of equipment so that the people will be grateful and happier.

1. **Senior Citizens Saving Scheme (SCSS):** This scheme talks about providing a savings platform for Indian residents who have attained the age of 60. The deposit matures after 5 years from the date of opening of the account. The interest rate is 8.6% and this is the highest rate of interest available in public, private and post office banks and it is deposited into the account quarterly.

2. **Pradhan Mantri Vaya Vandana Yojana (PMVVY):** It is a pension scheme given or provided by the government and the maturity is 10 years. This scheme has also started offering death benefits since 31 March 2020.

3. **Indira Gandhi National Old Age Pension Scheme:** It is a central government scheme offered to old age people started in the year 1995. It is meant for the people who are below the poverty line.

4. **Varishta Pension Bima Yojana:** It is a scheme introduced by NDA, directed through the LIC. The subscribers should invest a lump-sum amount and they get a pension at a guaranteed price of 9% interest.

5. **Rashtriya Vayoshri Yojana (RVY):** It is a scheme provided for the Below Poverty Line (BPL) category, and the expenditure for implementation of the scheme will be met for the "Senior Citizens" scheme, which is provided for those over the age of 60 years.

6. **Bank customer services:** This is to help senior citizens get benefits from the bankers, to protect them from insecurity and also to provide them with favourable advantages to the government scheme.

The above schemes include benefits given to both disabled and senior citizens which will benefit many people who belong to this sector and it also helps to lead a livelihood.

With all the mentioned points, wheelchair accessibility in India remains a huge challenge. There are infrastructural issues such as lack of ramps in many places, difficulty in using public transport, etc. These days, malls, tech parks and other places have facilities that are wheelchair friendly. However, these are available in urban areas and most rural places are not wheelchair friendly.

2. Literature Review

The ageing population requires essential facilities, as individuals increasingly depend on wheelchairs for mobility, having previously relied on canes for support. Negotiating with the help of a walker and wheelchair is a recent phenomenon (Eileen J Porter et al., 2010). Freedman, et al., (2002) also presented the same. The usage depends on one's physical capacity and common medical conditions for which they use the support. Nancy M Gell (2015, 20) details in her research on older adults' incidence of falls due to the incorrect use of mobility devices as it does not give her support at crucial times of need. The study makes a comprehensive assessment of the usage of mobility devices by senior citizens. The study points out that older adults using these devices have increased off late.

Much research has been undertaken on wheelchair services. Mathias & Gowran, R. J., (2021) point out that wheelchair manufacturing companies hardly provide training, maintenance and follow-up. The authors also identify the lack of commitment of the government to establish support channels for wheelchair users. The study also diagnoses that there is very little financial support for buying wheelchairs and it does not reach the needy. Finally, the study advocates for a global policy to address these challenges.

Andrew J. Rentschler (2003) evaluates a new modernized robotic walker to assist visually impaired people. The study details the new wheelchair physical support with navigational assistance and enhances mobility for users. The new wheelchair reduces the risk of falls and provides independent movement to its user. It has advanced sensors, controls and a computerized hurdles avoidance system. The new Veterans Administration Personal Adaptive Mobility Aid (VA-PAMAID) wheelchair demonstrations show that it is best used for indoor environments only and cannot be used for outdoor or climbing. The study concludes that traditional mobility aids are not very effective in real-world settings.

William C. Mann, et al., (1995) analyze the problems faced by senior citizens who use walkers, providing a holistic view based on user feedback and investigation. The consumer assessments study uses a battery of instruments to measure multiple dimensions relevant to the use of and the need for, assistive devices and environmental interventions. Their study involved 333 subjects, 69 of whom used walkers. Among these, 42 reported problems with their devices.

Common issues included difficulty and danger of use (57%), physical or mental impairments preventing use (17%) and decreased necessity due to improved health or other factors. The study identifies a couple of challenges, which are maintenance issues, discomfort and inefficiency in specific environments. Poor training and assessment led to inappropriate device selection for users' needs. A small proportion of users cited social stigma as a deterrent to use.

Beyond all, various types of walkers were discussed by T. Tamura et al., (2001) who noted minute details about the application and adaptation of these walkers. The walkers evaluated were conventional and were used by respondents as a routine. A caster walker which was power-assisted was used every day. Other walkers that were used to test the respondents were conventional folding walkers and used folding walkers. An important issue that was highlighted was the rehabilitation training and walking stages observed. The study highlights walking speed was checked between the aliments and movements were also measured during the process of the study. The activity was strictly under the supervision of a qualified therapist. The study revealed some of the respondents could not walk with power-assisted walkers.

With a significant rise in senior citizens, mobility aids must also increase. The situation is fair enough to discuss, physical mobility assistance, safety assistance, cognitive assistance and security assistance. Bernd Krieg-Brückner et al., (2012) studied different kinds of mobility aids for all kinds of disabilities but highlighted vision impairment for senior citizens. The authors were skeptical about the latest technology usage with navigation assistants

which automatically navigates the movements and path planning with Global Positioning System (GPS) sensors and odometry. Security assistance for emergencies automatically reaches the caretakers. The system should be able to support that at all times the caretakers can be in touch with.

A study by Amol M Karmakar (2012) is on prescription of wheelchairs to senior citizens. The sample size was 337 respondents of which 19 used manual wheelchairs and 318 used powered wheelchairs. The study considers patients with neurological conditions, pulmonary conditions, orthopedic conditions, hip conditions, spinal cord conditions or other ailments like cardiovascular, etc., for whom doctors would have prescribed using wheelchairs. The primary issues with the device were usability problems, positioning of wheelchairs, and disrepair conditions. The study finally concludes that wheeled devices should reduce the dependence on human assistance.

Erdmann WS (2018) in his study on equipment and facilities for the disabled concludes that in the future, the number of disabled will increase due to the usage of high-power gadgets and its side effects. The impact is more on youngsters. The disabled can achieve anything provided special training, care, support and strength from people around them. Training centres must be established for these people to help them learn and achieve better.

A study by Susan Allen, et al., (2006) focuses on understanding whether the home facilities or accommodations influence people who use wheelchairs. The study helps in understanding the life of people using wheelchairs and are dependent on others for help. The study concludes that there is a demand for providing suitable home care support and training to the care givers.

The study by Amol A. Kamarakar (2011) focuses on understanding the demographic factors of older or aged adults using wheeled mobility devices. Wheelchairs are classified into three main groups, they are manual wheelchairs, electric wheelchairs and scooters. According to this study, the demographic factors and the living standards of wheelchair users are associated with the difference in usage of the manual and powered wheelchair. Considering these factors help in advocating appropriate mobility device for the users.

3. Research Design

3.1 Objectives

1. To examine the present uses of wheelchairs and walkers for senior citizens.

2. To analyze the factors such as awareness, safety, training and equipment usage on the satisfaction level of users.

3.2 Data Collection

The data was collected by using convenience sampling from wheelchair users'. The data was collected using an interview schedule from senior citizens using wheelchairs. The data was systematically collected and analyzed using IBM-SPSS 23.

Simple percentage analysis and regression is used to analyze and interpret the data. The research falls under descriptive study (research) as the researchers are identifying the satisfaction of users towards wheelchairs as a product.

3.3 Sample Size

The sample size is 113 responses, of which, 32 are male and 81 are female.

3.4 Sampling Method

Convenience sampling is a type of research methodology of non-probability sampling where the sample is considered from a group of people with whom we can contact easily and they include malls, grocery stores, etc. It is a kind of grab sampling.

3.5 Hypotheses

H1: There is a significant relationship between satisfaction from usage and comfort.

H2: There is a significant relationship between satisfaction from usage and safety.

H3: There is a significant relationship between satisfaction from usage and quality.

H4: There is a significant relationship between satisfaction from usage and mobility.

H5: There is a significant relationship between satisfaction from usage and ambulation.

H6: There is a significant relationship between satisfaction from usage and training.

4. Data Analysis and Interpretation

Reliability Statistics: Table 1 shows that the reliability coefficient is 0.871. The data is reliable and can be subject to further analysis.

Table 1. Reliability Test

Cronbach's Alpha	N of Items
0.871	13

Source: Desk Research

Table 2 denotes that the profile of respondents. The sample constitutes 32 male respondents (28.31%) and 81 female respondents (72.32%). The age factor consists of 4 categories in which 30 respondents are from 60-70 years with 26.54%, 27 respondents are from the age group of 71-75 with 23.89%, 32 respondents from the age group 76-80 with 28.31% and 24 respondents are above 80 years with 21.23%.

The education factor consists of 3 categories in which 39 respondents are from PUC and below at 34.51%, 40 respondents of Graduates at 35.39%, and 34 respondents are postgraduates at 30.08%. 18 respondents (15.92%) have been using a wheelchair for less than one year at 37 respondents have been using a wheelchair for the past 2-3 years, 25 respondents have been using a wheelchair for past 3-4 years, and 33 respondents have been using a wheelchair from the above 4 years.

Table 2. Demographic Profile of the respondents

Variable	Category	No of Respondents	Percentage
Gender	Male	32	28.31
	Female	81	72.32
Age	66-70	30	26.54
	71 – 75	27	23.89
	76-80	32	28.31
	80 and above	24	21.23
Education	Pre-University Course (PUC) and below	39	34.51
	Graduate	40	35.39
	Post Graduate	34	30.08
Years of Usage	less than 1 year	18	15.92
	2-3 years	37	32.74
	3-4 years	25	22.12
	4 years and above	33	29.2

Source: Desk Research

Table 3. Type of wheelchair/walkers used and the medical conditions of such users

Wheelchair/ Walker Users	Total Number	Percentage
Walkers	7	6.19%
Wheelchair Users	106	93.81%
Category of wheelchair users		
Manual	52	49%
Powered	29	27%
Electric	12	11%
Motorized	13	12%
Usage Conditions		
Temporary condition	55	49%
Permanent condition	58	51%
Medical Condition		
Osteoarthritis	17	15%
Osteoporosis	36	32%
Hip fracture	27	24%
Stroke	16	14%
Dementia	9	8%
Others		7%

Source: Desk Research

Table 3 shows that seven were using walkers and 106 were using wheelchairs. Out of this, manual wheelchair users were about 49 per cent, powered wheelchair users were 27 per cent and electric and motorized wheelchair users together were 25 per cent.

Among the respondents, 49% of the respondents use wheelchairs, temporarily post-surgery. 51% use wheelchairs because of some permanent conditions (severe osteoporosis), replacement of hip joints, stroke and dementia.

Table 4. Table showing Chi-square test Statistics (satisfaction level from usage of wheelchairs and walkers)

Variables	Chi-square value	P value
Safety	42.309	0.015
Comfort	44.301	0.004
Mobility	42.12	0.006
Training	55.609	0.73
Quality	42.301	0.023
Ambulation	45.203	0.042

Source: Desk Research

From Table 4, it can be analyzed that the satisfaction level in usage is significantly associated with safety, comfort, mobility, quality and ambulation services associated with wheelchair usage (Safety (χ^2 = 43.309 and p = 0.015), comfort (χ^2 = 44.301 and p = 0.004), Mobility (χ^2 = 42.12 and p = 0.006), Quality (χ^2 = 42.301 and p = 0.023), ambulation (χ^2=45.203 and p = 0.042)).

It is evident from table 5 that R (Correlation Coefficient) = 0.362 shows moderate relationship between independent variables safety, comfort, mobility training quality and ambulation with satisfaction from usage of wheel chairs

Table 5. Regression-model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		df1
					R Square Change	F Change	
1	.362[a]	0.131	0.086	1.14008	0.131	2.893	5

Source: Desk Research

Table 6. Table showing Anova test statistics

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.777	5	3.56	2.893	0.018b
	Residual	124.79	97	1.3		
	Total	143.567	102			

Source: Desk Research

Table 7. Table showing Co-efficient summary

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	15.221	3.317	--	4.588	0
Safety	0.002	0.085	0.279	0.371	0.02
Comfort	0.77	0.83	0.113	0.921	0.059
Mobility	0.074	0.113	0.065	0.649	0.018
Training	0.53	0.117	0.324	0.892	0.712
Quality	0.51	0.93	0.225	0.61	0.004
Ambulation	0.026	0.87	0.03	0.297	0.067

Source: Desk Research

and walkers. R^2 (Coefficient of Determination) =0.131 that means only 13.1% of satisfaction level is explained by the independent variables considered in the study. Adjusted R^2 = 0.086 is lower than the R^2 value some predictors may not contribute notably to this model.

From Table 6, the goodness of fit of the regression model can be established through F statistics being 2.893. The significance value is 0.018 indicates the model is considerably significant.

From the above table 6 it is evident, that Sum of Squares (Total = 143.567) represents the total variability in satisfaction scores. It is the sum of the variation explained by the regression model. Regression Sum of Squares = 18.777, (df = 5). Measures the variation explained by the independent variables (Safety, Comfort, Mobility, Training, Quality, Ambulation). A higher Sum of Squares Regression means that the model explains a greater proportion of satisfaction variability. Also, Residual Sum of Squares = 124.79, (df = 97) predicts unexplained variance or error in the model. Residual sum of squares suggests that a significant portion of variability is not captured by the model. Regression = 3.56, Mean Square Residual = 1.3- these values help calculate the F-statistic, which determines if the model is statistically significant. F-Statistic (F = 2.893, p = 0.018). Since p = 0.018 (< 0.05), the regression model is statistically significant, meaning at least one independent variable contributes to satisfaction.

From the coefficient table (7) it is derived that constant (15.221) baseline value. Standard Error (SE) = 3.317 variability of the coefficient estimate. The t-Statistic = 4.588 the standard error, coefficient is away from zero. The p-value is the significance test.

The unstandardized coefficients (B) predict how much each variable impacts on satisfaction, safety (0.002, SE= 0.085), comfort (0.77, SE= 0.83) mobility (0.074, SE = 0.113), training (0.53, SE= 0.117,), quality (0.51, SE =0.93) and ambulation (0.026, SE= 0.87). The Beta value and t statistic of safety is 0.279 and 0.371, comfort 0.113 and 0.921, mobility 0.065and 0.649, training 0.324 and 0.892, quality 0.225 and 0.61, ambulation 0.03 and 0.297. All the variables show significant with the p values 0.02, 0.059, 0.018, 0.004 and 0.067 except for training where the p value (0.712) does not show significance.

5. Key Findings

1. The maximum number of respondents in the study are female. 81 respondents (72.32 per cent) are female and the rest are male respondents.

2. 18 respondents used a wheelchair for less than one year, 37 respondents have been using a wheelchair for the past 2-3 years, 25 respondents have been using a wheelchair for the past 3-4 years with 22.12%, and 33 respondents have been using a wheelchair from the above 4 years (29.20%).

3. The outcome of the coefficient's table, training ($p = 0.712$) is not statistically significant in predicting satisfaction. Safety, Mobility, and Quality ($p < 0.05$) have significant effects on satisfaction.

4. There is a lack of training for the users especially those who are using walkers and wheel chairs.

Conclusion

The current research reveals that there is a lack of training programs. More importance needs to be given to train the wheelchair users to enable them handle new technology along with the best quality and convenience. The companies selling wheelchairs and devices should bring the latest technology for users so that they feel comfortable using the service. The company can develop an application (app) to assist the customer or the users so that they feel confident enough to use the product with comfort.

A larger market can be reached with add-on navigation components for existing wheelchairs and walkers that help with additional sensors. Moreover, extension components can comprise security facilities. Moreover, Bernd Krieg-Brückner et al (2012) study also insists on training senior citizens in the usage helps more adaptability and comfort and reduces chances of injury or discomfort.

The study was limited to the Basavanagudi area of south Bangalore. The data was collected during September and October 2024. The scope of the study can be expanded to make the results more generalizable.

References

Allen, S., Resnik, L., & Roy, J. (2006). Promoting independence for wheelchair users: The role of home accommodations. *The Gerontologist, 46*(1), 115-123. https://doi.org/10.1093/geront/46.1.115 PMid:16452291.

Eileen Porter, & Benson, Jacquelyn & Matsuda, Sandy. (2010). Older homebound women: Negotiating reliance on a cane or walker. *Qualitative Health Research. 21*.

Freedman, V. A., Martin, L. G., & Schoeni, R. F. (2002). Recent trends in disability and full

functioning among older adults in the United States. *JAMA, 288*(24), 3137. https://doi.org/10.1001/jama.288.24.3137 PMid:12495394.

Gell, N. M., Wallace, R. B., La Croix, A. Z., Mroz, T. M., & Patel, K. V. (2015). Mobility device use in older adults and incidence of falls and worry about falling: Findings from the 2011-2012 National Health and Aging Trends study. *Journal of the American Geriatrics Society, 63*(5), 853-859. https://doi.org/10.1111/jgs.13393 PMid: 25953070 PMCid: PMC4439269.

Karmarkar, A. M., Dicianno, B. E., Graham, J. E., Cooper, R., Kelleher, A., & Cooper, R. A. (2012). Factors associated with provision of wheelchairs in older adults. *Assistive Technology, 24*(3), 155-167. https://doi.org/10.1080/10400435.2012.659795 PMid:23033733.

Krieg-Brückner, Bernd & Crombie, David & Gersdorf, Bernd & Jüptner, Alexander & Lawo, Michael & Mandel, Christian & Martínez, Antonio & Röfer, Thomas & Stahl, Christoph. (2012). *Challenges for Indoor and Outdoor Mobility Assistance*.

Mann, W. C., Hurren, D., Tomita, M., & Charvat, B. (1995). An analysis of problems with walkers encountered by elderly persons. *Physical & Occupational Therapy In Geriatrics, 13*(1-2), 1-23. https://doi.org/10.1080/J148v13n01_01

Mathias, K., & Gowran, R. J. (2021). A cross-sectional survey investigating wheelchair skills training in Ireland. *Disability and Rehabilitation: Assistive Technology, 18*(7), 1221-1228. https://doi.org/10.1080/17483107.2021.2001058 PMid:34788172h

Rentschler, A. J., Cooper, R. A., Blasch, B., & Boninger, M. L. (2003). Intelligent walkers for the elderly: Performance and safety testing of VA-PAMAID robotic walker. *The Journal of Rehabilitation Research and Development, 40*(5), 423. https://doi.org/10.1682/JRRD.2003.09.0423 PMid:15080227.

T. Tamura, M. Sekine, H. Kuno, M. Fujie, A. Mori and K. Andoh, "Evaluation of walkers for elderly people," *2001 Conference Proceedings of the 23rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Istanbul, Turkey, 2*:1391-1392. https://doi.org/10.1109/IEMBS.2001.1020460 PMid:11709199.

Ws, E. (2018). *Equipment and facilities adapted for disabled people in recreation and sport*. https://www.researchgate.net/publication/350365414_Understanding_the_Global_Challenges_to_Accessing_Appropriate_Wheelchairs_Position_Paper [accessed Dec 03 2024].