

**EMOTIONAL AND MENTAL WELLBEING OF ELDERLY  
DEPENDENT ON ASSISTIVE DEVICES**



**SUMMARY  
SUBMITTED TO  
BABASAHEB BHIMRAO AMBEDKAR (A CENTRAL) UNIVERSITY  
FOR THE AWARD OF DEGREE OF**

**Doctor of Philosophy  
in  
Human Development and Family Studies**

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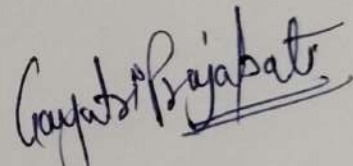
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## DECLARATION

I **Gayatri Prajapati**, hereby declare that this work embodied in this Ph.D. thesis entitled “**Emotional and mental wellbeing of elderly dependent on Assistive Devices**” has been carried out by me under the supervision of **Dr. Khwairakpam Sharmila**, Assistant Professor, Department of Human Development & Family Studies, School of Home Science, Babasaheb Bhimrao Ambedkar University Lucknow.

This Research work is an original work and has not been previously submitted in part or full for any other degree or diploma to this or any other University. I also declare that the thesis is essentially free from all kinds of plagiarism.



(GAYATRI PRAJAPATI)

Date: 25/07/2023

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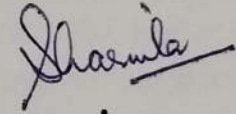
## CERTIFICATE

This is to certify that the thesis entitled “**Emotional and mental wellbeing of elderly dependent on Assistive Devices**” submitted by **Mrs. Gayatri Prajapati** is an original research work and has not been previously submitted in part or full for the award of any other university.

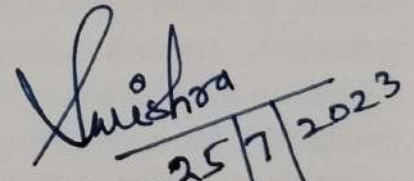
The thesis submitted to Babasaheb Bhimrao Ambedkar University Lucknow satisfies all the requirements as stipulated in the *Doctor of Philosophy (Ph.D.) regulations as amended in 2017* and it is fit for submission and evaluation for the award of the degree of Doctor of Philosophy of the University.

**Date:** 25/07/2023

**Place:** LUCKNOW



**Supervisor**



**Head of the Department**

### **SUMMARY**

India has one of the fastest-rising ageing populations in the world (Anvayaa 2019). Ageing is a universal, continuous, and irreversible process. However, the age at which one's productive contribution declines and becomes financially dependent may be regarded as the beginning of the older stage of life. According to the National Elderly Policy, everyone 60 years or older is considered elderly (Dristi 2019). The elderly population in India has been growing significantly since 1961, reaching 138 million in 2021, according to a study by the National Statistical Office (NSO). Globally, a steady change in the age structure of the population is undergoing, with both the percentage and number of older individuals in the total population rising quickly. Globally, the proportion of people aged 65 years and above is anticipated to rise from 9.3 per cent to 16.0 per cent by 2050 (United Nation 2020). From proportion of people over 60 in the world will nearly double from 12 to 22 per cent between 2015 and 2050. Eighty per cent of the world's elderly population will reside in low- and middle-income nations by 2050. The population is aging considerably more quickly than in the past (World Health Organization 2021).

According to the Assistive Technology Act of 2004, "any object, piece of equipment, or product system, whether commercially obtained, modified, or adapted." which is used to enhance, maintain, or improve the functional abilities of persons with disabilities falls under the broad definition of assistive technology (Leopold et.al 2015). Assistive products and technologies are defined by the International Classification of Employment, Disability and Health (ICF) as any product, equipment, device, or technology that has been modified or especially created to enhance the functioning of a disabled or elderly person. The use of assistive technology aims to promote independent movement, lessen disability, delay functional decline, and lower healthcare costs (Arefin et al., 2020). Canes, wheelchairs, prostheses, hearing aids, visual aids, daily living aids, and specific computer hardware and software that can enhance communication, hearing, vision, or movement are examples of assistive technologies (WHO 2018 & Physiopedia 2022). Assistive technology can include tools and solutions facilitate to beat useful limitations and prolongate freelance. Caregivers could get immediate respite, experience less stress, and be able to deliver care more easily and safely with the aid of assistive technology and by creating elderly-friendly home environment (Gitlin L.N., et al. 2001). Agree & Freedman (2011) reported that assistive technology enhances psychological well-being because it gives freedom to the elderly to choose the kind of activity, the time to conduct the activity, and the method of execution. The main element of

quality of life for elderly people is being allowed to live in their own homes rather than in a long-term care facility. Assistive devices are devices whose major goal is to maintain or increase a person's independence and functioning in order to promote participation and overall well-being.

### **RATIONALE OF THE STUDY**

During later adulthood, the ageing population is likely to develop limitations with daily activities, including mobility and self-care. Such limitation prevents older adults to stay connected with society and their loved ones, thus, impacting the overall well-being of older adults. Social isolation and loneliness are affecting the physical, mental, and emotional health of elderly and these are common among seniors in contemporary society. Improved technologies intended to relieve loneliness and social isolation among seniors and considered as being significant in expanding and sustaining their mental and improving emotional well-being. Various research studies supported that the usage of assistive devices enable older adults to be less dependent towards others and promotes inclusion and participation in society. It helps the ageing population to stay healthy and satisfying lives. However, prior research intends to focus on the roles of technology in ageing and quality of life, positive technology for elderly well-being or factors influencing acceptance of technology for ageing in place.

Thus, looking upon the limitation of earlier studies the present study is planned with the following objectives:

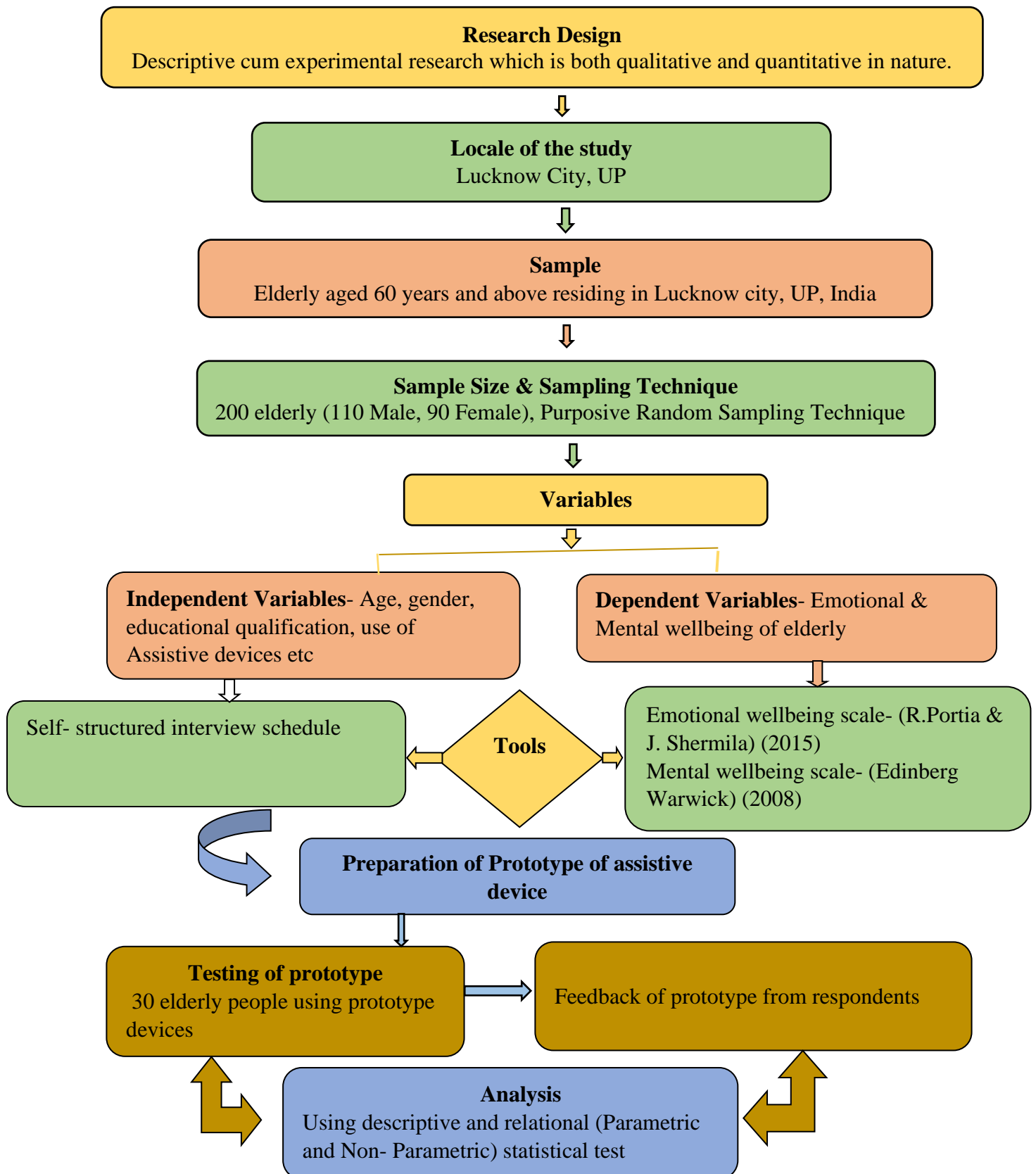
- 1) To identify different assistive devices used by elderly
- 2) To identify the problems faced by elderly when not using assistive devices
- 3) To assess the mental well-being of the selected sample.
- 4) To assess the emotional well-being of the selected sample.
- 5) To develop a prototype of an assistive device based on the suggestions given by the elderly.
- 6) To explore the pre and post-test effect of the developed prototypes on mental and emotional wellbeing of the respondents

### **HYPOTHESIS**

- Ho1: There exist no significant differences in assistive devices used by elderly across age & gender
- Ho2: There exist no significant differences in the problems experienced by elderly of different income group across age & gender.
- Ho3: There exist no significant differences in mental wellbeing of elderly across different age group.
- Ho4: There exist no significant relations in between mental wellbeing and gender of elderly.
- Ho5: There exists no significant differences in emotional wellbeing of elderly of different age group.
- Ho6: There is no significant association between level of emotional wellbeing and gender of elderly
- Ho7: There exists no significant differences in pre & post- test effect of the developed prototype on the mental and emotional wellbeing of elderly.

**METHODOLOGY**

**SCHEMATIC REPRESENTATION OF RESEARCH STUDY**



### PHASE WISE PLAN OF WORK

The present research was carried out in the following phases

**Phase -I-** Finalization of tools.

- (i) Self- Structured Socio-Demographic Profile Sheet.
- (ii) Self- Structured General uses of assistive devices Checklist
- (iii) Mental wellbeing scale developed by Edinburg Warwick (2008)
- (iv) Emotional wellbeing scale developed by R. Portia and J. Shermila (2015).

**Phase-II-** A pilot study was conducted to carry out a preliminary study to identify the problems in conducting the study so that required modification could be made before final data collection.

**Phase-III-** In third phase, the sampling method was finalized in order to select the sample for the purpose of data collection.

**Phase-IV-** Collection and entry of data.

**Phase- V-** In the fifth phase, the researcher developed a prototype device as per the suggestions given by the elderly. Feedback about the prototype device was also recorded from the respondents

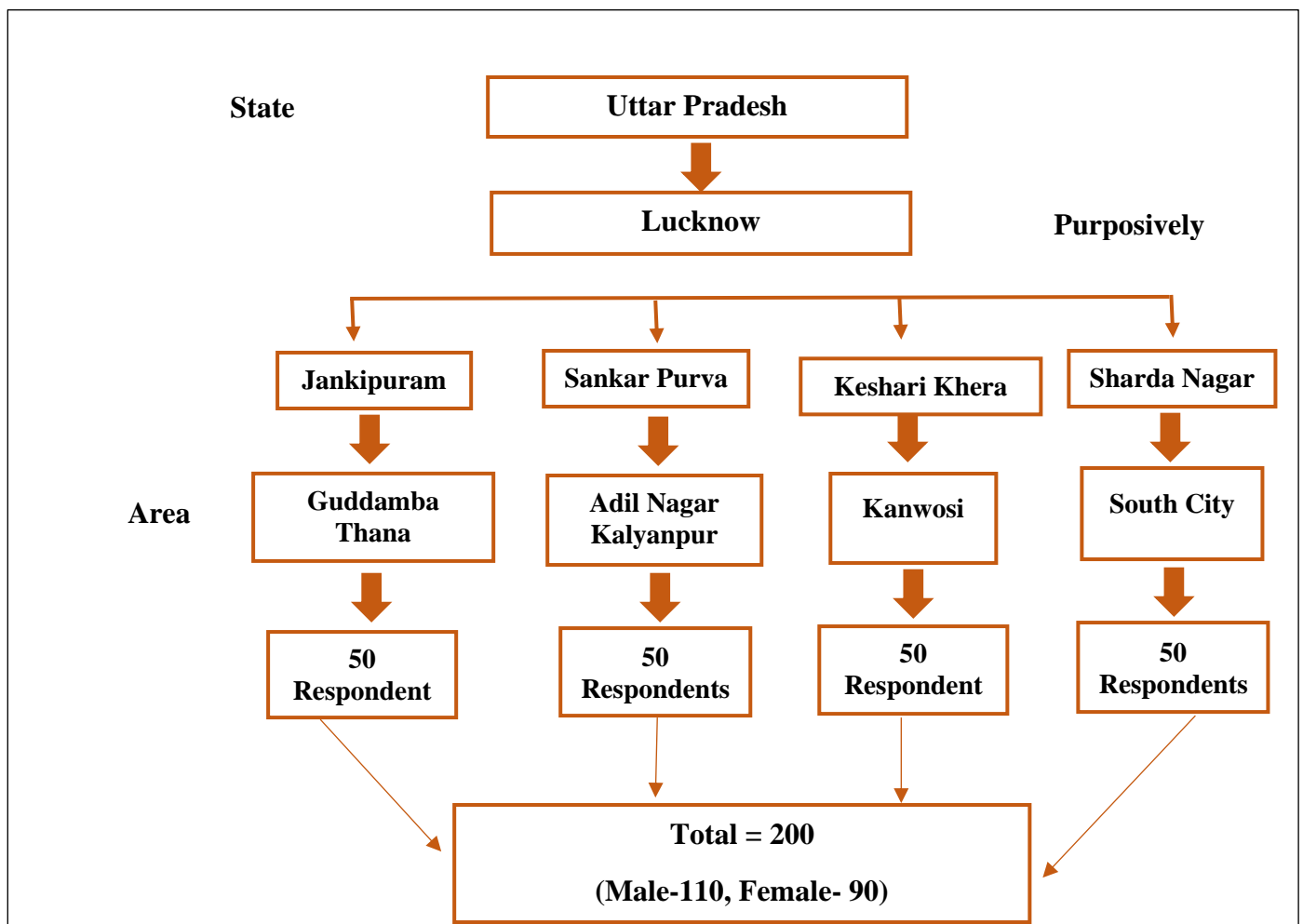
**Phase-VI -** In this last phase, the collected data was analysed by using various statistical tools, fit in proper construction table and summary and conclusion was drawn.

### PROCEDURE FOR DATA COLLECTION

<b>Preparation of tools and finalizing</b>	A Self-structured questionnaire/Checklist for Socio demographic profile & General uses of assistive devices
	<b>Standardized Psychological Scales</b> <ul style="list-style-type: none"><li>• Emotional wellbeing scale by R. Portia &amp; J. Shermila (2015)</li><li>• Mental wellbeing scale- by Edinberg Warwick (2008)</li></ul>
<b>Pilot Study</b>	Insights gained from pilot study were incorporated in the final study.

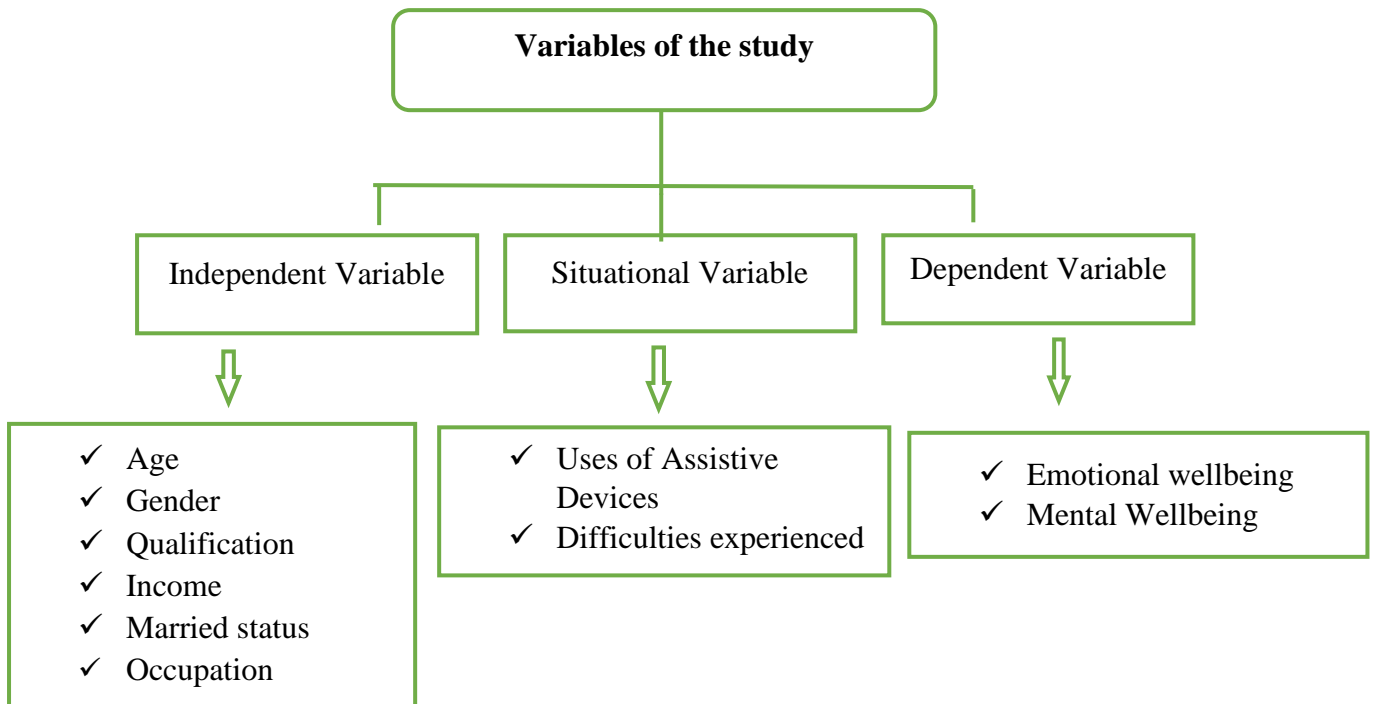
## Emotional and mental wellbeing of elderly dependent on Assistive Devices

	The reliability of the questionnaires was 0.622 Cronbach's alpha.	
<b>Main Study</b>	Pre-Assessment phase	Collecting data using self-structured and standardised instruments
	Testing of prototype	Applying the developed Prototype device among 30 elderlies to test functionally
	Post Assessment phase or Feedback	Collecting data using self-structured checklist to see if any improvement takes place in mental & emotional wellbeing of respondents



Graphical representation of Sample design

### VARIABLES OF THE STUDY AND OPERATIONAL DEFINITION



Graphical representation of variable of the study

### DEVELOPMENT OF PROTOTYPE DEVICE

Based on the observation, analysis of results and feedback given by the elderly, a set of criteria was developed to design the prototype. The prototype was designed on the basis of problems identified by elderly and which they would like to add or the problems they experience while using the existing assistive devices. Different devices help enhance cognitive functions based on individual need such as reminder or alarm clocks, calendar, sensor, smartphone etc. proposed improvement was incorporated in the prototype device for elderly and a smart walking stick with wi-fi camera was developed with the following features.

- ✓ **Quad walking stick** for mobility or moving anywhere independently.
- ✓ **WI-FI camera** to connect both user and caregiver anywhere.
- ✓ **Torch** for flashing in dark place or darkness.
- ✓ **Battery** to supply power to torch and camera.
- ✓ **Micro controller** to connect obstacle sensor and torch.
- ✓ **Obstacle** sensor to detect hurdles.
- ✓ **Buzzer** for giving instruction.

- ✓ **Pill box** for keeping medicine.
- ✓ **Grip** for holding stick.

### **STATISTICAL ANALYSIS**

Statistical analysis is the organisation and analysis of quantitative or qualitative data using statistical procedures, including both descriptive and inferential statistics. It's the science of collecting, exploring and presenting large amounts of data to discover underlying patterns and trends.

### **MAJOR FINDINGS OF THE RESEARCH**

#### **Identify different types of assistive devices**

The socio-demographic profile of the elderly was explored using a self-structured questionnaire.

In the first phase, different types of assistive devices used by elderly people were identified. A standard questionnaire was prepared to evaluate the use of different types of assistive devices available in the market, and the difficulties experienced by elderly during non-using of assistive devices.

- Majority (41.5%) of the elderly were in the age group of 60-65 years followed by aged 65-70 years after that 70-75 years and only 14 per cent were aged above 75 years.
- A significant 55 percent of the elderly were male while 45 percent of the elderly were female.
- The qualification of the elderly revealed that major proportions (40.5%) of them were illiterate while 25.5 percent were educated till primary, 12 percent of the elderly up to secondary level while 5 per cent of them were Graduates and 17 percent elderly studied till post-Graduate.
- The occupational status of the elderly revealed that the majority (55%) of them were not working, a major proportion 27 percent of the elderly were retired from service, 10 percent elderly in service and 8 percent of the elderly were self-employed.
- Regarding assistive device usage it was more among male as compared to female.
- Regarding usage of assistive devices across age, it was found that the older the age, the usage of assistive devices was more. Data reveals that above 75 years elderly were using more devices followed by 70-75 years, 65-70 years and 60-65 years respectively.

## **Emotional and mental wellbeing of elderly dependent on Assistive Devices**

- Highly significant differences were observed in the usage of cognitive devices, communication devices, positioning devices (wedge seat, cushion), lens and significant differences were observed in the usage of walking stick, eyeglasses and commode seat across the occupational status of the respondents.
- Regarding the use of assistive devices by the elderly on the basis of monthly income, the use of assistive devices is more by the elderly who have a higher monthly income. Wedge seats, cushions, headphones, smartphones, simple phones, diaries, calendars and alarms were found to be highly significant and walking sticks, wheelchairs, spectacles, lenses, hearing aids, shower seats/chairs, commode seats, computers/laptops/tablets and were found to be statistically significant.
- The relationship between the age of the respondents and general uses of assistive devices, a highly significant relationship exists in mobility devices and communication devices, and positive correlated with other devices.
- The relationship between the gender of the respondents and general uses of assistive devices, reveals a highly significant relationship in the uses of communication devices ( $r=.234^{**}$ ) and significant relation in cognitive devices, positive correlated with other devices.
- The relationship between occupational status of the respondents and general uses of assistive devices. It was found that occupational status of the elderly and assistive devices was correlated negatively (Pearson  $r = -.503$ ,  $p \leq .01$ ).
- The relationship between the monthly income of the respondents and general uses of assistive devices. The relationship between monthly income and general use of assistive devices was found to be positively correlated and highly significant ( $r= 0.536$ ,  $p < 0.001$ ).

## **Difficulties experienced by elderly when non-dependent Assistive Devices**

- The result also reveals that majority (92%) of the elderly were facing problem using computer and unclear vision (Near-sighted & farsighted) without using eyeglasses followed by a problem like unable to walk properly without using any supportive devices.
- Difficulties experienced by elderly across gender showed that female elderly experienced more difficulties as compare to male elderly. Further, a greater number of the female elderly was facing difficulties using communication devices i.e., computer and smartphone than male.

## **Emotional and mental wellbeing of elderly dependent on Assistive Devices**

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- It is evident from the data that older people faced more difficulties. The Mean  $\pm$  SD data also revealed that above 75 years old elderly experienced more problems while they were not using assistive devices. All the difficulties were statistically significant ( $P=.000$ ) at the level of 0.01.
- The elderly who was non-working were facing more difficulties like being unable to walk properly without any mobility support, being unable to recall recent memory or sitting in Indian toilets, they also reported facing difficulties in using smartphones and computers compared to another group of elderly. It was found to be highly significant at level of 0.01.
- The relationship between difficulties experienced by the elderly with different independent variables reveals a highly significant positive correlation in age and marital status with difficulties experienced by elderly ( $r=.796$  &  $.332$ ;  $p<0.001$ ) respectively, and statistically significant with the occupational status of the elderly. Further, it was negatively correlated with gender and monthly income

### **Assessment of mental well-being of the selected sample**

- Statistically highly significant differences were observed in the mental wellbeing of the elderly across age. 60-65 years elderly were found good in mental wellbeing as compared to older age groups of elderly.
- It was found that occupational status has no positive correlation with mental wellbeing of elderly.
- The relationship between age and mental wellbeing of the elderly depicts a negative correlation with each other and found to be highly significant.
- Positive correlation exists between gender and mental wellbeing of the elderly.
- It is obvious from the result that those elderly have good incomes, and all their needs were continued to be fulfilled, their mental wellbeing was also found to be good.
- Emotional and mental wellbeing of elderly were positively correlated
- A significant association between level of mental wellbeing and the age of the respondents were also found in the study.
- Regarding the level of mental wellbeing and gender of the respondents, it was found that male elderly is mentally better than female elderly.

### **Assessment of emotional well-being of the selected sample**

## **Emotional and mental wellbeing of elderly dependent on Assistive Devices**

- Statistically highly significant data depicts that the younger age of elderly, they were found good in emotional wellbeing compare to older group.
- There was no significant difference between emotional wellbeing and gender of the respondent. The male elderly was emotionally better as compare to female elderly.
- It was also observed that age and emotional wellbeing of elderly were correlated negatively.
- Result revealed that occupational status and emotional wellbeing of elderly were corelated negatively (Pearson  $r = -.406$ ,  $p \leq 0.01$ ). It is clear from the result that occupational status has no positive correlation with emotional wellbeing of elderly.
- Data clearly depicts a highly significant and positive correlation in between emotional wellbeing and monthly income of elderly which shows that the more income they are getting they tend to have better emotional conditions.
- Looking upon the level of emotional wellbeing of elderly across age, it was found that younger elderly aged 60-65 years were emotionally good as compare to other age group of elderly.
- It was also found that emotional wellbeing of the male elderly was better than female.

### **Prototype developed based on the suggestions given by the respondents**

- Based on the response given by the selected elderly regarding features which they would like to improve/add in the prototype to be developed Smart Wi-Fi Cam Stick (a prototype) for elderly people was developed. The main features included in the stick include a wi-fi camera, obstacle system, pill box, torch etc.
- The developed prototype was tested on some selected elderly people. Various parameters of the developed cane were compared with the cane already used by the respondents. It was found to be highly satisfied by the elderly after using the developed stick.
- Responding to a prospective component of the study, a prototype device used by the elderly for three months was found to have a positive impact on their mental and emotional wellbeing.
- It was reported by the respondents that the developed walking stick is better in many aspects like mobility, controllability, obstacle detection, and emergency contact with caregivers and has better portability than the cane they were using regularly.
- Data depicts the features present in device they were using already. The main features added in the walking stick were adjustable height, quad for balancing grip and torch.

- The mental well-being of elderly was found to increase in post-tests as compared to pre-test. A huge difference was found between pre-test and post-test of mental wellbeing, in which only 12 percent of the elderly had above average mental well-being in the pre-test, which increased to 43 percent in the post-test.
- The difference between pre-test and post-test of mental wellbeing of elderly was found to be highly significant ( $t=29.986$ ,  $p=.000$ ) at level of 0.01.
- The emotional well-being was compared between those using the stick regularly and the device developed by the researcher. It was found that Majority 80.5 percent of the elderly were in good emotional wellbeing in pre-test, whereas, 83.5 percent of the elderly who were using prototype device were having emotionally good in post-test, in which their emotional well-being increased in the post- test compared to the pre- test.
- The difference between pre-test and post-test of emotional wellbeing of elderly was also found to be highly significant ( $t=99.872$ ,  $p=.000$ ) at level of 0.01.

### Conclusion

The present study findings suggest that assistive technology is used more by male elders of older age groups than female elderly. They experience various types of problems such as; being unable to stay connected with loved ones, cognitive problems, vision problems, positioning problems etc. Among all the problems, unclear vision and mobility problems were the two problems that were faced by a majority of elderly people. Assistive technology can more effectively improve safety, control, and participation for people with greater levels of functional limitations. It is necessary for them to make use of it to improve the mental and emotional well-being of the elderly. In this study, it was also found that elderly people use eyeglasses the most, as well as walking sticks for balance and to prevent falls. A walking stick is the most preferred walking aid because it is easy to use, and is easily accessible to all. Thus, a Smart Wi-Fi Cam Stick (Prototype) was developed as per the suggestions given by the elderly. Elderly people who use assistive devices are prepared to function in a self-care capacity as they perform activities that maintain life, health, and well-being. The study further reveals that younger elderly were emotionally and mentally well as compared to other groups while male elderly was strongly emotionally and mentally better than female. Self-care activities are influenced by awareness and the use of assistive devices. Therefore, knowledge about assistive devices should be imparted as well as assistive devices should be provided to them to prevent complications and develop a positive attitude about self-care.