

# **Age Friendly Streets For elderly population in Urban villages of Delhi**

## **A DISSERTATION**

*Submitted in Partial Fulfilment of the  
requirements for the award of the degree  
of*

## **MASTER OF ARCHITECTURE**

*Submitted by*

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JUNE 2019**



## CERTIFICATE

Certified that dissertation entitled “**AGE FRIENDLY STREETS FOR ELDERLY POPULATION IN URBAN VILLAGES OF DELHI**” which has been submitted by Sachin Verma, in partial fulfilment of the requirements for the award of the post graduate degree of Master in Architecture, in the Department of Architecture and Planning, Indian Institute of Technology Roorkee (IITR), is the student’s own work carried out by him under my supervision and guidance. The matter embodied in this dissertation report has not been submitted for the award of any degree of this or any other institute.

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I hereby declare that the work, which is being presented in the report entitled “**AGE FRIENDLY STREETS FOR ELDERLY POPULATION IN URBAN VILLAGES OF DELHI**” in the partial fulfilment of the requirements for the award of the degree of Master in Architecture, submitted in the Department of Architecture and Planning, Indian Institute of Technology Roorkee (IITR), is an authentic record of my own work carried out during the period from July 2018 to June 2019 under the guidance of Dr.Sonal Atreya, Assistant Professor, Department of Architecture and Planning, Indian Institute of Technology Roorkee (IITR), India.

The matter embodied in this report has not been submitted by me for the award of any degree of this or any other institute.

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**Table of content**

**Chapter 1**

1	Research Proposal.....	3
1.1	Introduction.....	3
1.2	Need/Relevance of the Study .....	3
1.2.1	Real Morbidity rate & perception .....	6
1.3	Aim .....	9
1.4	Objectives.....	9
1.5	Scope & Limitations.....	10

**Chapter 2**

2	Literature Review .....	13
2.1	Introduction.....	13
2.1.1	What is a Street? .....	13
2.1.2	Street in Indian Context .....	13
2.1.3	Streets as interaction spaces.....	14
2.1.4	Primary User Base .....	14
2.1.5	Interaction parameters and environment framework for elderly in street.....	15
2.2	Street Parameters .....	15
2.2.1	Width of street .....	15
2.2.2	Neighbouring elements.....	16
2.2.3	Street context in Health and Human Lives.....	16
2.2.4	Street context in Work and Productivity.....	17
2.2.5	Street context in Business and Real Estate .....	17
2.3	Principles of street Design for Elders in Urban Context.....	17
2.4	Parameters Identified for Designing Age Friendly Streets.....	18
2.4.1	Parameters for pedestrian services .....	18
2.4.2	Parameters for physical & psychological inconveniences.....	18
2.5	Anthropometric space requirement for elderly people in street .....	19

2.5.1	Seating space requirement.....	19
2.5.2	Movement space requirement.....	19
2.6	Global Approach to Urban Street Design .....	20
2.7	Inferences from Case Studies .....	20
2.8	Methodology .....	22
2.9	User Group.....	23
2.10	Research Tools Used.....	23
2.11	Data Collection Framework.....	23
2.12	Types of Observation Methods .....	24
2.12.1	Unstructured, non-interactive observation.....	24
2.12.2	Structured, non- interactive observation .....	24
2.13	Observations.....	24
2.14	Participatory Methods.....	25
2.14.1	Limitations .....	26
2.15	Semi structured interviews during the focus groups .....	26
2.16	Focus Group Sessions .....	26
2.16.1	Comparison and corrections.....	26
2.17	Cultural/Social anthropology study.....	27
2.18	Tools for Data Collection .....	27
2.18.1	Tools for Data Analysis .....	27
2.19	Occasions, Gatherings or celebrations by Elderly Groups.....	27
2.19.1	User Group.....	27
2.19.2	Context of Application .....	27
2.19.3	Tools for Data Collection .....	27
2.19.4	Tools for Data Analysis .....	28
2.20	Interviews .....	28
2.20.1	User Group.....	28
2.20.2	Context of Application .....	28

2.20.3	Advantages .....	28
2.20.4	Limitations .....	28
2.20.5	Tools for Data Collection .....	29
2.20.6	Reinterpretation & Data Analysis.....	29
2.21	Activity Mapping/Daily path tour.....	29
2.21.1	Spatial configuration .....	29
2.21.2	Spatial cognition.....	30
2.21.3	User Group .....	30
2.21.4	Context of Application.....	30
2.21.5	Advantages .....	30
2.21.6	Limitations .....	30
2.21.7	Tools for Data Collection .....	31
<b>Chapter 3</b>		
3	Primary Site Studies .....	35
3.1	Site study 1: Ber Sarai.....	35
3.1.1	Location.....	35
3.1.2	Skeleton of Streets & vehicular connection .....	35
3.1.3	Activity mapping for elderly .....	36
3.1.4	Elderly Survey (Ber Sarai, New Delhi).....	42
3.1.5	Inferences.....	44
3.1.6	Location.....	46
3.1.7	Study & Impact Area .....	47
3.1.8	Elderly questionnaire survey (KATWARIA SARAI) .....	52
3.1.9	Inferences.....	53
3.2	Site study 2 :Munirka .....	54
3.2.1	Location.....	54
3.2.2	Study and Impact Zone.....	55
3.2.3	Activity mapping.....	56

3.2.4	questionnaire.....	60
3.3	Site Study 3: Vinod Nagar (Mandawali).....	61
3.3.1	Elderly Survey Questionnaire .....	67
3.4	Challenges in Research with Elderly People .....	69
3.4.1	Relations and interactions .....	69
3.4.2	Informed Consent .....	69
3.4.3	Protection of confidentiality.....	70
<b>Chapter 4</b>		
4	Conclusion .....	73
4.1	Strategies to make streets elder friendly .....	73
4.1.1	Through Direct Observation .....	73
4.1.2	Through survey and questionnaire.....	74
4.2	Intervention Planning .....	75
4.2.1	Phase One .....	75
4.2.2	Data collection and analysis from phase one .....	76
4.2.3	Phase Two.....	79
4.2.4	Phase 3.....	81
4.2.5	Technological Solutions -Smart Pole .....	81
4.3	Further Study.....	82
<b>Chapter 5</b>		
5	References .....	85



## List of figures

Figure 1 Age Tree for India (2015) .....	3
Figure 2 Statistics of Elderly growth in India .....	4
Figure 3 Marital Status (Age above 60).....	4
Figure 4 Educational Qualification (Age above 60) .....	5
Figure 5 Mental Distress & Depression rate in Elderly people (South Delhi) .....	5
Figure 6 outside interaction time of elderly people (South Delhi) .....	6
Figure 7 Morbidity rate of elderly people .....	6
Figure 8 Active Elderly Population (South Delhi) .....	7
Figure 9 Comparison of Morbidity and activity rate .....	7
Figure 10 Elderly Population in India .....	8
Figure 11 Percentage of elderly population in workforce (State wise) .....	9
Figure 12 Katwaria Sarai Street View .....	14
Figure 13 Elderly anthropometric dimension for preferable seating posture .....	19
Figure 14 Turning Radius for elderly .....	19
Figure 15 Global Approach to Urban Street Design .....	20
Figure 16 Ber Sarai- Study & Impact area .....	36
Figure 17 Ber Sarai- Street hierarchy .....	37
Figure 18 Figure 16 Activity mapping for Ber Sarai .....	37
Figure 19 A-PNB ATM with Resident car parking in front .....	38
Figure 20 B-View from ATM to market on side.....	38
Figure 21 Laundry service person space before the narrowing street .....	38
Figure 22 Activity point A.....	39
Figure 23 Section of street at A.....	39
Figure 24 activity point B.....	40
Figure 25 Plan at C.....	41
Figure 26 Section showing park and adjacent street Inferences .....	42
Figure 27 Elderly person sitting outside smoking hookah .....	44
Figure 28 Bikes parked ahead of encroached shops.....	45
Figure 29 Location & Street hierarchy map .....	46
Figure 30 Elderly Census Data .....	46
Figure 31 Impact Zone.....	47
Figure 32 Street site plan with adjacent community park .....	48
Figure 33 Section with Community Centre compound.....	49

Figure 34 Section with Katwaria Gumbad .....	49
Figure 35 Wide Street Site section with adjacent Park .....	49
Figure 36 Location Plan .....	50
Figure 37 View of A.....	50
Figure 38 Plan A.....	50
Figure 39 View at B.....	51
Figure 40 Plan at B.....	51
Figure 41 VIEW at C .....	51
Figure 42 Plan at C.....	51
Figure 43 View of park and Salvage Dealers shop.....	51
Figure 44 Street view with encroachment from shops & houses .....	52
Figure 45 Munirka Street Site Location Map.....	54
Figure 46 Elderly Census Data .....	55
Figure 47 Study and Impact Map of Munirka.....	55
Figure 48 Street Site Plan .....	56
Figure 49 Closed Shops with seating and standing space in front .....	57
Figure 50 Centre court panorama view (taken from c point shown above).....	57
Figure 51 Centre Court Dimensions .....	58
Figure 52 Dead end street encroached by residents with boundary walls and cantilevers .....	59
Figure 53 Location and proximity to west vinod nagar metro station .....	61
Figure 54 Park at the entrance on both sides and hospital ahead at right .....	62
Figure 55 Street map .....	62
Figure 56 Street crossing at junction 1 .....	63
Figure 57 Section A at junction 1.....	64
Figure 59 Section B at junction 1.....	64
Figure 58 View at section B .....	64
Figure 60 Street part plan for elevation .....	65
Figure 61 Elevation one part 1 .....	65
Figure 62 Elevation one part 2 .....	65
Figure 63 Elevation one part 3 .....	65
Figure 64 Uneven Balconies and entrance steps.....	66
Figure 65 Elevation one part 1 banded façade.....	66
Figure 66 Elevation one part 2 banded façade.....	66
Figure 67 Elevation one part 3 banded facade.....	67

Figure 68 Proposed elevation .....	67
Figure 69 Open air gym in Ber Sarai park used by elderly .....	73
Figure 70 Metal bench .....	76
Figure 71 Wooden bench .....	76
Figure 72 Cement bench .....	76
Figure 73 Activity & mutual comfort correlation analysis .....	76
Figure 74 Benches Measurement data in Urban Villages .....	77
Figure 75 Seating preferences according to comfort level grouping in fig. 58 .....	77
Figure 76 Seating postures activity & time graph .....	77
Figure 77 Most preferred seating arrangements.....	78
Figure 78 Seating backrest and seat angle options.....	78
Figure 79 Comfort issues with light intensity & colour temperature .....	79
Figure 80 Feedback regarding problems with seating provided.....	80
Figure 81 Seating point to maximum walkable distance calculation.....	80

### List of Tables

Table 1 Parameters for pedestrian services .....	18
Table 2 Parameters for physical & psychological inconveniences.....	18



## ABSTRACT

Streets are the primary unit of city experience. In Indian context street plays a very important role as streets are core component of the community structure in Indian neighbourhoods. After rigorous urban development of Delhi open spaces have become difficult to come by and even if they are available, they are not complemented by the quality of streets. So in most cases Streets become the primary open spaces for people. Making streets more comfortable specifically for elderly in urban villages have not been looked up to till now. Streets in Urban villages are ill managed and have no regulations extensively followed for encroachment and parking. Due to the informal and abrasive condition of streets they have become less and less approachable & usable by elderly to interact. This lack of interaction is leading up to loneliness and other mental distress factors.

Research Study concentrates on identifying the factors that affect the street experience positively or negatively for elders. The activity mapping of street and its usage by the elderly people and to identify the activity hotspots for interactions of elderly. To establish the relationship between psychology of spaces and physical feasibility of elderly people to come up with strategies to improve upon street design.

Methods used for data collection are Survey questionnaire filled while asking questions to elderly for basic activities done outside through the day. Direct observation and activity mapping was done to keep the activity landmarks and behavioural observation and data recording of interaction, seating postures, seating locations and duration of activity data.

Analytical tools which are used for the study are correlation analysis & variance analysis to find the trends & comfort zone for seating postures and walking distances.

Conclusion for the study are the guidelines for improvement of street to help elderly people utilize the street for their daily activities and comfort efficiently. Provision of services which encourage the activity of elderly in street for physical and mental health improvements as well as their social value encouragement. Strategies are provided in phase development model as urban villages have limitation for big scale interventions



## ACKNOWLEDGEMENTS

First of all, I am grateful to Almighty God, for enabling me to complete this report.

I am greatly indebted to my guide Dr.Sonal Atreya for her dedicated guidance, keen

Interest and constructive criticism, which have contributed immensely to the evolution of this report & study. I am especially thankful to my friends Tejaswini, Zia, Kaushik, Rishikesh and Manish for their support throughout my thesis. I'm also thankful to my seniors Tanuja, Arshad, Jinoj, Avjeet and Swapneel Sir for supportive guidance in my research work.

I'm grateful for the constructive criticism given by the architecture department faculty members for improvement of my work

Last but not the least, I would like to thank my family: my parents and to my sister for supporting me spiritually throughout writing this dissertation and my life in general. I'm grateful to their eternal support, money and understanding of my goals and aspirations. Their infallible love and support have always been my strength











# Chapter 1

## Research Proposal





# 1 Research Proposal

## 1.1 Introduction

Streets are the nerves of a city. They shape the form of city as we move through it. Streets accommodate people, vehicles, utilities, vegetation, signage, lighting & street furniture. Streets either make up the biggest part of our public realm or contribute to the parts that make it. Urban Design & inclusivity have a very strong relation in terms of street as a component. Inclusive design principles make streets more beneficial to people in an urban scenario as it caters to a large audience while keeping its familiarity intact. Streets being a mean to provide access, also are public spaces in themselves. In developing countries like India where population density is very high, streets also are the play spaces for kids as well as socializing space for elder people. Performing so many functions at the same time with such less attention paid to their design is the anomaly of functional strategy in street design which needs to be addressed

## 1.2 Need/Relevance of the Study

Increasing road traffic in urban areas is pushing streets as buffer zones and are becoming more and more unsafe for the elderly, hence they have to be designed better to accommodate the requirements of elderly.

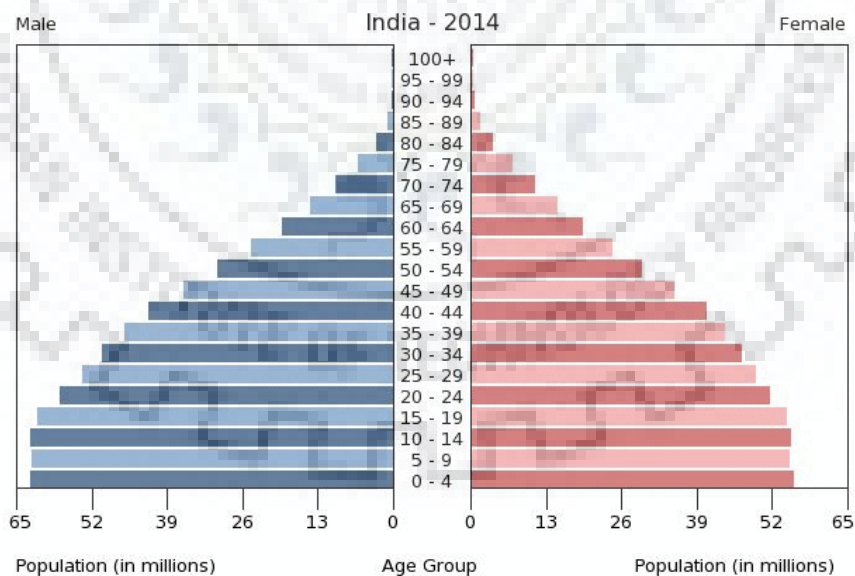


Figure 1 Age Tree for India (2015)

Source: WHO

Population density in urban areas of developing countries make streets primary public interaction space for elderly and hence need to be designed to suit the needs for them.

## Elderly Population

In India, the growth of the elderly population (60+ years) has always been more than that of general population. Also, the share of the elderly in the population has been going up since 1961. While in 1961 about 5.6% of the population was above the age of 60, that proportion increased to 8.6% in 2011...

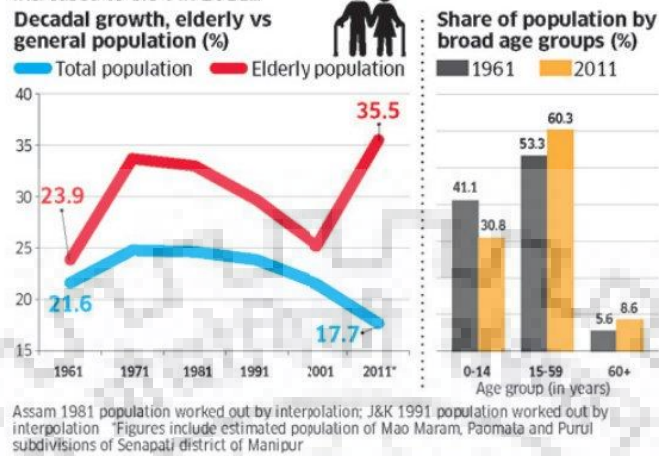


Figure 2 Statistics of Elderly growth in India

Streets are transition spaces and need to be safe & secure. Level of safety it should provide being a transition space for elderly as well as elderly who have a large difference in their behaviour characteristics on streets demands rethinking of street design.

Streets being slow zones of city becomes the experience zones and have more relevance to be designed for liveability & experience. Lack of active streets which are well designed to handle vehicular traffic & security are leading to unsafe streets for ageing population.

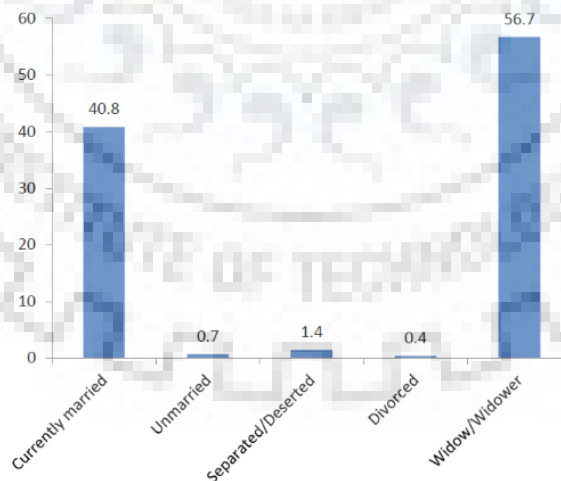
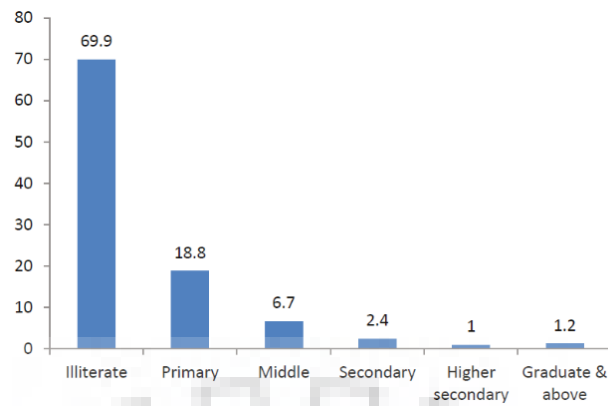


Figure 3 Marital Status (Age above 60)

Source: Help Age India 2014

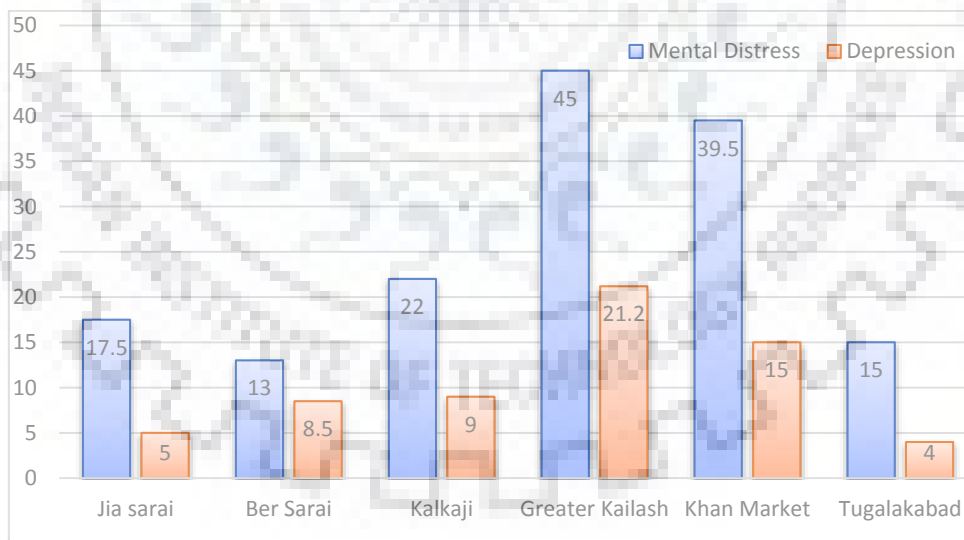


**Figure 4 Educational Qualification (Age above 60)**

Source: Help Age India 2014 Socio-economic survey 2014

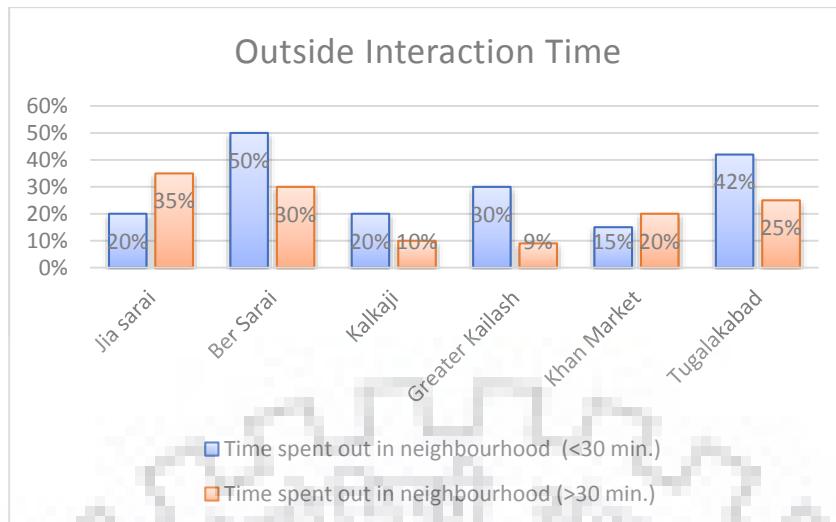
Lack of companionship and skills to contribute to society is becoming the reason of antisocial behaviour and anxiety in Elder people. Interaction in social spaces help them to boost their confidence and encourage them to learn new things while keeping them away from anxiety and health issues.

Data given by Helpage India in graph bellows shows a correlation that the time spent by the elderly outside is directly relation to mental distress and depression in elderly population of following places in Delhi.



**Figure 5 Mental Distress & Depression rate in Elderly people (South Delhi)**

Source: Socio-economic survey 2014



**Figure 6 outside interaction time of elderly people (South Delhi)**

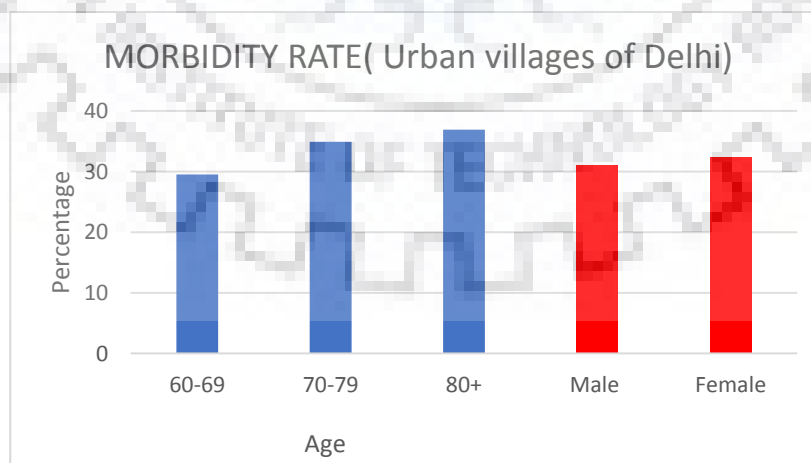
Source: Socio-economic survey 2014

Value addition or lack of it by negligence of a large part of our society population is hampering the growth of communities. Role identification for senior citizens through their activity study can help us in giving concrete objectives to them.

Social Wellbeing of society through adding positive attributes by finding their needs & comfort parameters & providing for them.

**1.2.1 Real Morbidity rate & perception**

Morbidity rate is defined as rate of being diseased in a place. Elderly people with age is more prone to disease infestation hence have a high morbidity rate as shown in the fig. 5 below

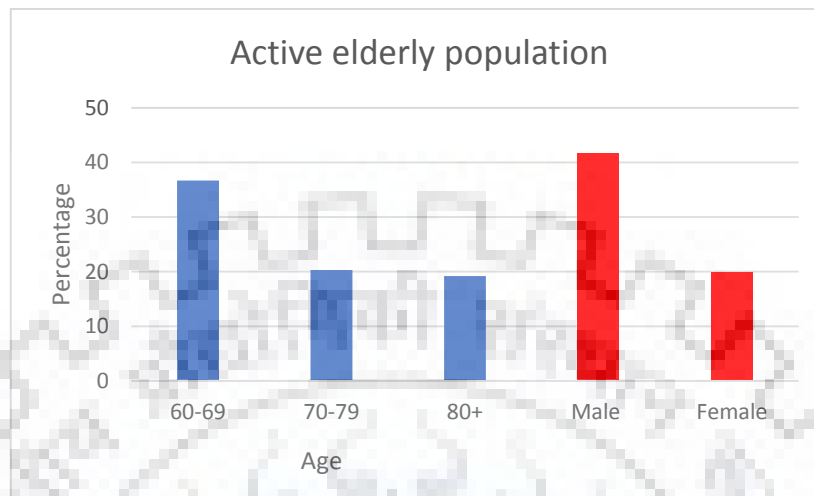


**Figure 7 Morbidity rate of elderly people**

Source: India Ageing Report 2017



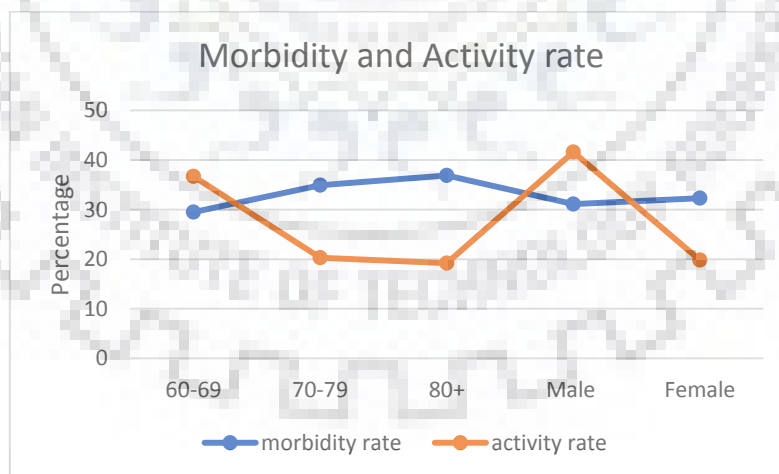
Now considering the fact that morbidity rate including the smallest disease as well as all health condition there is less than 40% of the elderly population who are diseased or are not in condition to interact with outside environment.



**Figure 8 Active Elderly Population (South Delhi)**

Source: India Ageing Report 2017

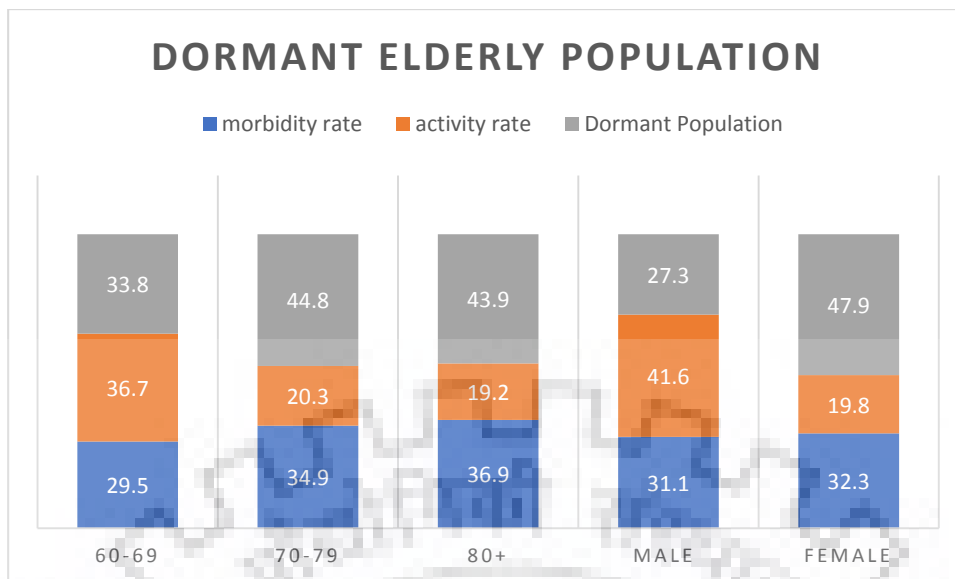
The Population of elderly people which are active outside their home is way too less compared to population of elderly which are healthy as shown in the comparison graph below. Difference shown in graph might not be significant enough as it doesn't show a clear picture but if we look through total stack charts the results for the remaining population is clear.



**Figure 9 Comparison of Morbidity and activity rate**

Source: India Ageing Report 2017

Dormant population is the population of elderly people who are healthy enough to go out but do not go out due to perception of morbidity which is way higher than the real rate of morbidity.



**Figure 10 Elderly Population in India**

*Source: India Ageing Report 2017*

- Perception of morbidity turns out to be elderly having an inherent feeling of being always sick to not perform any activity outside their home, this perception is encouraged by the negligence and avoidance of family members considering elderly people to be compulsively nagging and over exaggerative about their health problems.
- Reasons for Perceptive Morbidity & Dormant behavior of Elderly is considered to be following as per the analysis of data given by Helpage India.
- Lack of Motivation due to the fast-paced urban scenario where everyone is busy elderly people in these urban villages have been unable to find their niche and hence get demotivated for any interaction outside.
- Lack of skill or participation in workforce.

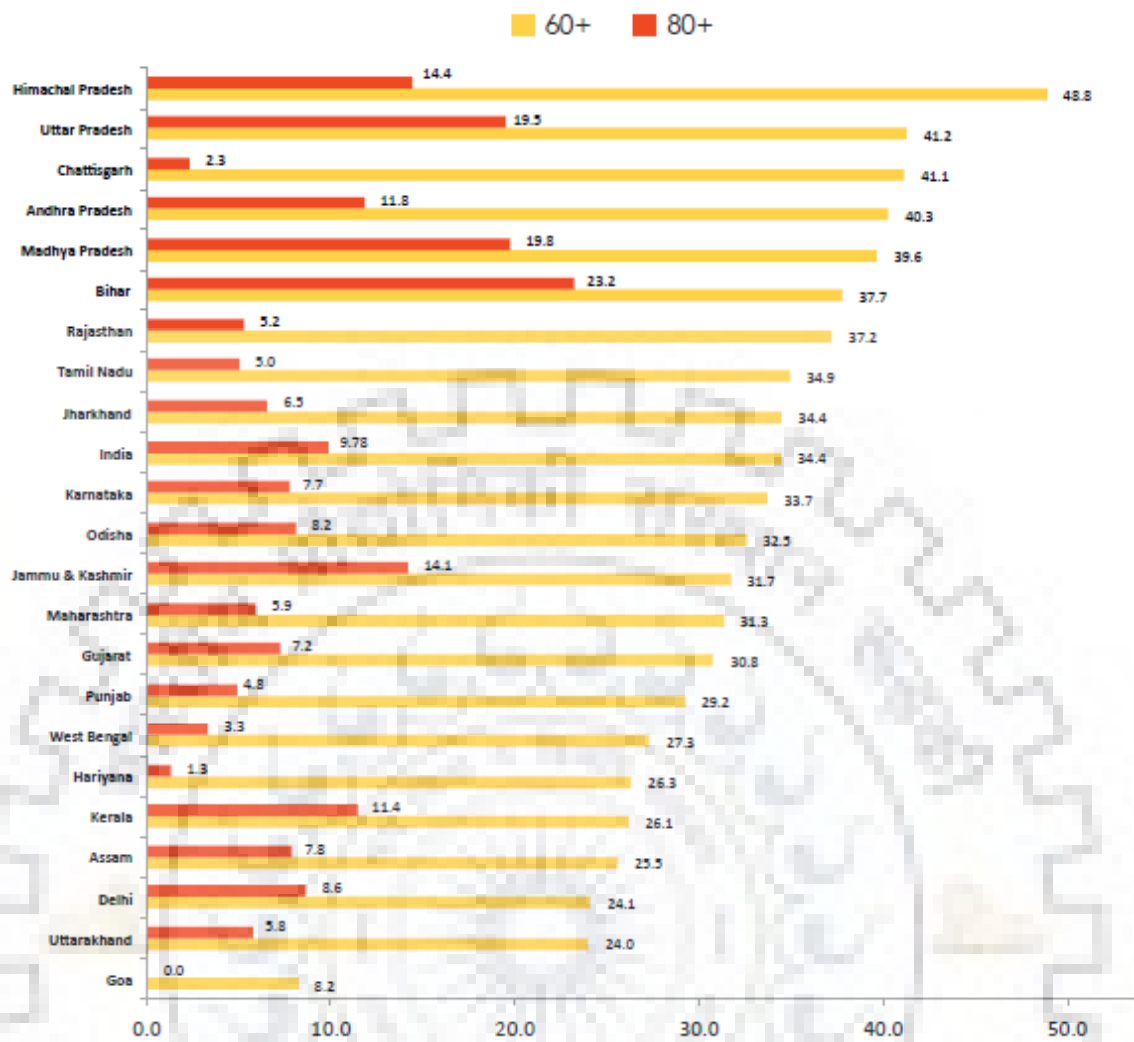


Figure 11 Percentage of elderly population in workforce (State wise)

Source: India Ageing Report 2017

### 1.3 Aim

To identify the parameters and analyse current condition of streets to give design recommendations of age-friendly streets for elderly population in Urban Villages of Delhi.

### 1.4 Objectives

- To collect data on age friendly streets design techniques around the world.
- Analysing and finding the tools for identifying parallels with Indian street scenarios.
- Identifying street case studies and conducting interviews and surveys regarding its context, location and user group.
- To understand the activity pattern and identify design parameters and provisions for elderly people to provide design recommendations.

### 1.5 Scope & Limitations

1. Study covers the residential areas in urban villages of Delhi as case study examples.
2. Study includes the public parks, transition spaces if directly connected through the street for reference purposes.
3. Study doesn't cover highway as well as any road broader than 15m ROW.
4. Study does not cover the operation and maintenance of the street.



# Chapter 2

## Literature Review





## 2 Literature Review

### 2.1 Introduction

Each city offers lessons on the range of challenges presented in street design processes, as well as best practice strategies for others to learn from.

#### 2.1.1 What is a Street?

Street is the most basic unit of the city, like a brick through which a city can be experienced. It is often misconceived as the two-dimensional surface that vehicles drive on when moving from one place to another. Streets are, in fact, multidimensional spaces consisting of many surfaces and structures. They stretch from one property line to another, including the building edges, land uses, and setbacks that define each side. They offer space for movement and access and facilitate a variety of uses and activities. Streets are dynamic spaces that adapt over time to support environmental sustainability, public health, economic activity, and cultural significance. (Global Designing Cities Initiative, 2007)



Source: Global

#### 2.1.2 Street in Indian Context

Streets in India traditionally have been the public spaces around which social life has revolved. They consist of urban public realm. The informal city in urban centres in India is deeply

Interwoven with the formal city Streets in India become an expression of community that is living there. India being a developing country has very high population which results in scarce land resources like parks hence streets also act as a public space for Indian Urban areas.

Dimension to which a street is defined in Indian context vary in a very wide spectrum from 15m to as low as 2m.



**Figure 12 Katwaria Sarai Street View**

*Source: Author*

### **2.1.3 Streets as interaction spaces**

Street being the primary interaction space after a person gets out from a house or building makes it a transition space at the same time it has elements which encourage slow moving traffic hence more time to experience its edges and slow moving components. Streets have more probability of interaction as compared to roads & other transition spaces as it's a perfect combination of commuter ambiguity & user friendliness.

Streets in India unlike the International standards are more prone to pedestrian traffic and commercial activities than mere transportation of multiple kinds.

People living in urban villages of India are more prone to street space issues as compared to regulated areas as the spaces for the multiple activities street serve are haphazard and are not well designated in any law.

### **2.1.4 Primary User Base**

Primary user for the street in these urban villages are children and elderly as they stay at home and have social or public interaction throughout the day on street. Out of which Elders are the Direct Independent user of the street.



Activates for which elderly people use the street in Urban Villages

1. Walking
2. Transition space (walking dogs & taking grandchildren to park)
3. Relaxing
4. Social Interaction (with friends & neighbours)
5. Commercial Interactions (hawkers & service persons)

### **2.1.5 Interaction parameters and environment framework for elderly in street**

Frameworks and parameters are essential in establishing a unanimous consensus between stakeholders about the key factors of age-friendliness of a street in its contextual environment, and set aim and objectives in relation to achieving them. The parameters can be used to measure the minimum level of age-friendliness of the street and observe its development over time as relevant strategies are implemented.

This framework can also help in establishing overall principal ideas for ideal community where the spectrum of age and space continuum is kept in mind while designing any relevant spaces.

Elderly population in a street is variably different from many user bases in an area as they don't have the same functional compulsions as other age groups as well as have behavioural wisdom as an interaction parameter.

In simpler words the type of activities they perform are not always urgent or sorts to a community purpose or dependability for someone like middle aged people who are running a house.

Behavioural wisdom connects to the age factor for their behaviour redundancy as they have lived their life to most part and have notions about their interactions with other people. Its limitations as well as particular selection circle. So unlike kids they don't have naivety and have more compatibility issues with particular environments & people.

## **2.2 Street Parameters**

### **2.2.1 Width of street**

- In urban villages street width is a very crucial parameter as it defines the type of use formally or informally a street can adhere to.
- In case of New Delhi, Urban villages have width of street starting from 1m to 8m at max.

- Though the spectrum of street width appears to be very small but due to informal usage an encroachment factors street width have variable usage according to its connections.
- Width of street available for pedestrian and vehicles is defined by the use case scenario of streets but in many case width of street also defines what suitable street function for its respective width is.

### **2.2.2 Neighbouring elements**

Function and traffic on street is also define by the neighboring elements and connecting street to the current street. These elements are mentions as follows.

#### **Connecting street**

- **Scenario one**

Type of street connecting to the objective street has a vital effect on the environment of the objective street.

If connecting street is a wide street and has less traffic volume than it can act as an auxiliary parking spaces for the vehicles of the narrow street.

- **Scenario two**

In the same way if the wider connecting street has a market or commercial shops as primary function than the objective street can act as a buffer space for the pedestrians and smaller vehicles to avoid traffic.

#### **Connecting road**

If there is a major road connects directly to the objective street then the street becomes a feeder street for the place.

In this scenario approachability of street increases in terms of convenience but at the same time safety of street decreases. In these types of cases intervention have to be planned according to

### **2.2.3 Street context in Health and Human Lives**

The cost of lives lost and serious injuries caused by road crashes have a significant impact on the economy. Better-designed streets relieve mental and physical stress, lowering medical expenses and the need for social services.(Global Designing Cities Initiative, 2007)

#### **2.2.4 Street context in Work and Productivity**

Significant numbers of human working hours are lost as a result of time spent in congestion or injuries incurred in road crashes. These lost hours result in reduced productivity and, therefore, economic losses.(Global Designing Cities Initiative, 2007)

#### **2.2.5 Street context in Business and Real Estate**

Pedestrians, cyclists, and transit riders generally spend more money at local retail businesses than people who drive cars, underscoring the importance of offering attractive, safe spaces for transit riders, pedestrians, and cyclists. Great streets have also been shown to add value to neighbourhoods.(Global Designing Cities Initiative, 2007)

### **2.3 Principles of street Design for Elders in Urban Context**

- Streets that are multifunctional.
- Streets with Safety & reliability
- Streets are primary public space
- Streets for physical wellbeing.
- Streets are Public Spaces
- Streets have commercial value
- Streets for Context. (Global Designing Cities Initiative, 2007)

## 2.4 Parameters Identified for Designing Age Friendly Streets

### 2.4.1 Parameters for pedestrian services

**Table 1 Parameters for pedestrian services**

Issue	Observation/inconvenience
Traffic Congestion	High volume at level crossings creates fear in elderly to cross the road. Harsh driving. Silent and high-speed vehicles.
Footpath on one side	Having footpaths only one side, no footpath for safe walking. Narrow path and overcrowding make walking difficult.
Footpath Quality and Compositions	The poor paving condition, use of uneven/broken slabs, bricks or tiles. Broken/unpaved surfaces. Abrupt level changes, dirt, and sand obstructing safe walk or wheelchair users.
Hindrances	Ill-planned parking, dustbins along paths, Street vendors, with goods spread on the footpath. Broken kerbs, pillars, and rubbish. Car exit /entry cuts, Cyclists and shared tracks
Pedestrian Crossings	Lack of road crossings and road markings. Short time to cross at signaled intersections, escalator/elevator for a foot over bridges, lack of instruction regarding crossing. Uncontrolled vehicle speed near to the crossing areas.
Other Facilities	Footpaths without street lights, community/police aid poles. Footpaths without rest areas; seats and benches

### 2.4.2 Parameters for physical & psychological inconveniences

**Table 2 Parameters for physical & psychological inconveniences**

Issue	Observation/inconvenience
Fear	Crossing roads: Wider roads take more time to cross, Provision of the traffic island to ease the situation. Overcrowded paths, fear of getting lost in the crowd.
Balance	Risk due to slow walking and reaction time, falling, and wheelchair usage is high with deteriorated pavements
Vision	Lack of street lighting added to impaired vision and light pollution heightens problems of safety and security; creates loneliness, fear.
Hearing	Risk due to slow reaction time lowered ability to identify objects and obstructions, especially threats.

## 2.5 Anthropometric space requirement for elderly people in street

### 2.5.1 Seating space requirement

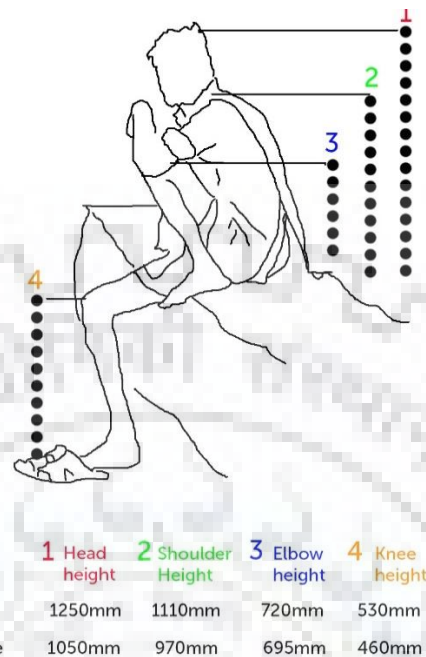
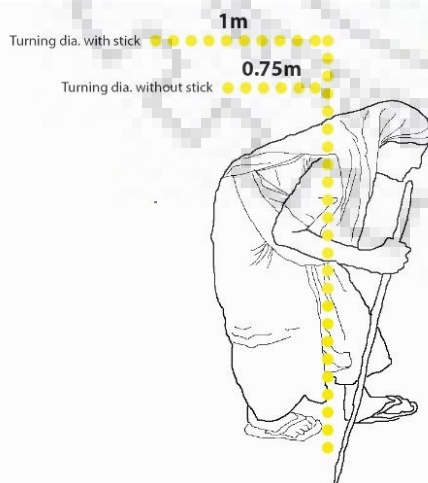


Figure 13 Elderly anthropometric dimension for preferable seating posture

Source: Author

- Seating depth requirement for elderly for safe seating – 550mm
- Safe angle for correct seating posture 95-103 degrees.

### 2.5.2 Movement space requirement



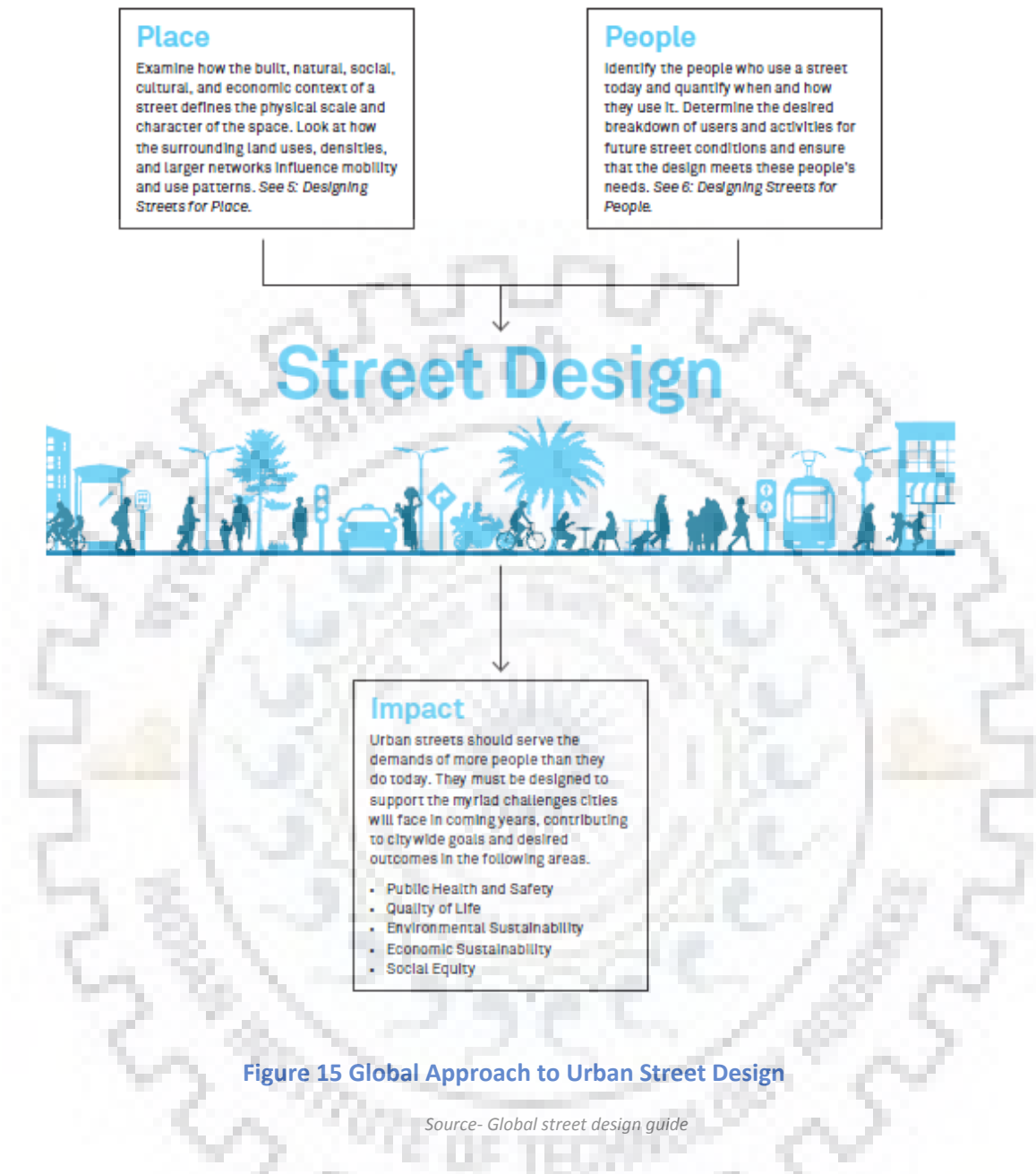
While walking on the street small hindrances like parking of bikes become severe obstruction for elder people to walk as they have to walk around them.

Permanent protrusions by fixed equipment like cooler, AC should not be places in street as they can be hazardous to elderly with impaired vision.

Clear space provided for walking should be equal to turning space as they might need support to walk at significant distance.

Figure 14 Turning Radius for elderly

## 2.6 Global Approach to Urban Street Design



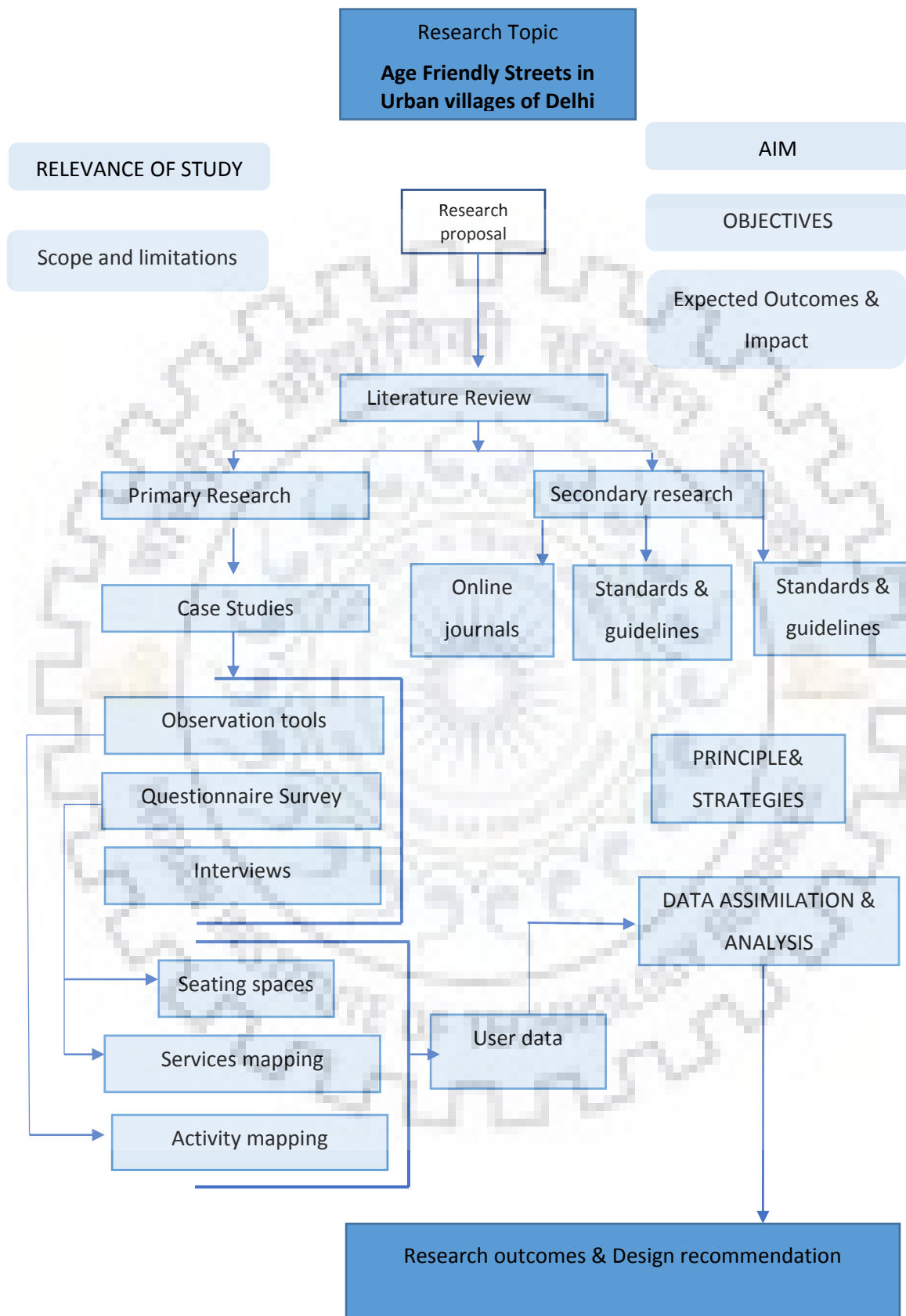
## 2.7 Inferences from Case Studies

- Street Design should take care of economic as well as environmental sustainability.
- Street design for elders cannot take only elderly as exclusive user group and preferences for other user group has to be taken care of in terms of **adaptability for elders**.
- Scale of the street and its width to height ratio from the adjacent building plays an important role in design of street.
- Function of street also affects the perception of visitors hence affect the end user group of streets.

- Quality of street doesn't exclusively depend upon the infrastructure and services provided but, on the participation, and interaction of the users also.
- Designation of zones for usage defines the maintenance as well as safety factor of the zone in terms of traffic & accidents.



## 2.8 Methodology





According to previous researches conducted in same field following methods are devised to pursue the research.

## 2.9 User Group

- Elderly people
- Family members
- Service providers

## 2.10 Research Tools Used

- Observational tools
  - Videography-
    - Interaction between older people (Groups & gatherings)
    - Proxemics & support they generally use (Height & comfort)
  - Mapping
    - Street furniture & their positioning
    - Steps, Ramps & Hindrances.
    - Lighting levels at night.
    - Mapping of dark corners & niches
- Interviews
  - Structured
  - Unstructured Interviews
- Questionnaires.
  - Only to be given where interviews are not possible.
- Rating Scales
  - To be used at the end of interviews to quantify the responses

## 2.11 Data Collection Framework

Observation tools is the most important tool as it devises the understanding of the researcher about the study and its context while observing people in their local setting without being an intruder to the conditions they are in. It's a bird eye view for the trained eyes to look for the issues, solutions that people have uses for certain issues. Interaction patterns and conditional usage of spaces can also be observed through observational tools.

## 2.12 Types of Observation Methods

### 2.12.1 Unstructured, non-interactive observation

- In this method, the researcher is supposed to observe the elderly in their natural settings, their activities, interaction with the space and their communication with other elderly. All these observations are supposed to be done from a distance without interrogating or questioning any of their activities. The observations must be carefully and consistently recorded in the research diary and documented properly.
- Proxemics of elder people with street furniture & other people.
- Distance upto which elderly people can walk before taking a support or seating.
- Interaction with flora and fauna
- Stimulants in the streets that affect them e.g. Sound, smell or light.

### 2.12.2 Structured, non- interactive observation

In this method, the researcher does not attempt to participate in the activities of the elderly. On the contrary, he is supposed to record observations on a regular basis, that is, every day at regular intervals of time, by monitoring the activities of an individual or a group of elderly over a specific period of time. These times must be pre-decided as per the purpose of the study.

- Structure time-based observation for usage of spaces by elderly at specific time intervals eg. Walks after meals, walking the pets or playing with children in the evening or morning.
- These observations define the consistency of behavioral patterns and gives the fundamental requirement for analysis rather than specific behavior at one single time.

## 2.13 Observations

1. Activities: recreation, group activities
2. Places: Home, street, neighborhood, parks, interaction nodes
3. Conversations: topics, ideas, celebrations etc.

## Contexts of Application

To generate initial research questions

To verify or cross check information obtained from other methods in the study. For eg. Speed of walking while going out with pets, seating intervals with children and interaction spaces.

- To develop rough initial indicators for people or events a researcher wants to investigate, that can be tested using other methods and tools.

### **Advantages of the method**

1. The framework for conducting the study may or may not be structured.
2. If the researcher is clear about the aim and objectives of the study, the method is purposeful and specific.
3. The method is organised and limited to stipulated time intervals.
4. It is a passive method of conducting a field research since the researcher is supposed to observe from a distance and not engage with the observant.
5. The results of the study can be both, qualitative and quantitative.

### **2.14 Participatory Methods**

Participatory methods for Elderly work better as with the age they have formed their opinions about their comfort and wellbeing and are very well known to the issues that they face during the day for their outings and interactions. Understanding the problems and suggesting solutions without their participation might lead up to the rejection of solutions.

- Elderly people without loco motor disability
- Elderly people with loco motor disability and need assistance
- Caretakers of people who have loco motor disability and are verbally impaired and still have active daily routine.

### **Context of Application**

- To understand their environment, household and community composition
- To understand life situations and ethnography of the elder people.
- Their past history and experiences

### **Advantages**

- The most important advantage of this method is that it is more or less reasoning method hence it encourages open interaction & positive argumentation for self-good.
- Most elderly people enjoy chit-chatting etc.
- It gives an insight into elderly's perception of individual & overall community problems.

### **2.14.1 Limitations**

- The method is not applicable for elderly with verbal impairments.
- Not every elderly is extrovert, therefore everyone may not be interested.
- Older elderly might consider it to be a wasteful method to present their thoughts.
- There is possibility of wrong interpretation of personal/individual issues by researcher if the researcher does not interact with the elderly while they are discussing.

### **2.15 Semi structured interviews during the focus groups**

Interaction with the focus group while they are discussing altogether helps the researcher in understanding the context of the issue raising. Some elders might have a specific conditions for a problem that they might be promoting but it's not all prevailing and at times may not be resolved through th objectives of the study.

### **2.16 Focus Group Sessions**

Elder people in focus group session will have to concur on the idea of what the discussion is about and how they have to go about the discussion naturally to get the important issue out but not argue on trivial things.

Time spent on one issue which has been discussed in detail has to be kept in check by the conductor of the focus group. Notes about overall agreement on common issues and important points made by the users has to be noted as assistive measure. Users who are weaker and have more assistance required to present their issues should be given equal preference as they are the equal users of the street.

#### **2.16.1 Comparison and corrections**

If there are more than one focus group discussions than the data collected from both have to be collected compared and cross checked for any glaring point which might be missed due to intense discussions about irrelevant topics.

If focus groups are conducted side by side than the cues from one group to direct the conversation in right direction can be uses by the conductor of focus group.

## **2.17 Cultural/Social anthropology study**

Culture of a place also defines the type of requirements people have in a street hence cultural anthropological study is required to understand the behaviour pattern over time as it is under time constraints of the study.

Important occasions, festivals and gatherings have to be identified and made note of so that overall frequency of social interactions & no. of people taking part can be calculated.

## **2.18 Tools for Data Collection**

- Camera
- Semi structured questionnaire

### **2.18.1 Tools for Data Analysis**

- Photo Elicitation – Compiling, organizing and interpreting the photographs taken by the elderly. Listing the important elements identified from the photographs.
- Conversation analysis from interviews – The answers obtained after the interviews need to be analyzed and the results need to be correlated with the results of the photographs and videos.

## **2.19 Occasions, Gatherings or celebrations by Elderly Groups**

### **2.19.1 User Group**

- For all ages & education group.

### **2.19.2 Context of Application**

- To understand their perception of space and environment
- To understand their life Situations and ethnography
- To gain knowledge about their past history and experiences.

### **2.19.3 Tools for Data Collection**

- Cameras and audio recorder
- Semi- structured interviews

#### 2.19.4 Tools for Data Analysis

- Photo Elicitation- Compiling, organizing and interpreting the photographs taken by the elderly. Listing the important elements identified from the photographs. Like which place has enough space and which place people prefer to sit in gatherings and occasions.
- Conversation analysis from interviews- Getting the opinion from all about their convenience or any obstacle they face while attending any celebration. Level of discomfort can also be identified through rating scale.

#### 2.20 Interviews

Interviews in one form or another are, together with observations, the most common method used in research with elderly. Interviews with elderly are considerably different from interviews with adults. They are more inclined towards narrative side hence the researcher get to understand the core preferences of the user in very personal way. Elderly people unlike adults are less shy and more honest about making their opinion as they are more or less oblivious to the experience of life.

##### 2.20.1 User Group

- For All groups
- Elderly with minimum level of comprehension and without any mental problems.

##### 2.20.2 Context of Application

- To understand their perception of space and environment
- To understand their life Situations and ethnography
- To gain knowledge about their past history and experiences

##### 2.20.3 Advantages

- Semi-structured questions give direction to the interviews
- The results obtained are in the form of verbal audio recordings and narratives, therefore it's easy to interpret the results.
- Group interviews preferable since elderly feel comfortable in answering questions with peer group rather than being interrogated alone.

##### 2.20.4 Limitations

- Reliability of answers: based on experience
- Lack of understanding on the part of elderly

- Not applicable for deaf/ mute, unlettered elderly

### **2.20.5 Tools for Data Collection**

- Semi- structured questionnaire with open ended questions

### **2.20.6 Reinterpretation & Data Analysis**

- Content analysis: The contents of the questionnaire must be analyzed, and the answers should be categorized accordingly.
- Conversation analysis: The conversation between the elderly and the researcher must be recorded and heard again to interpret the answers of the elderly and also their intermediate pauses and reactions.
- Analytical induction: A tool to develop, analyze and organize the presentation of research findings. Its objective is to use analytical reasoning to formulate causes for the issues.

### **2.21 Activity Mapping/Daily path tour**

- Elders will be encouraged to provide a tour of the daily path (if any) traversed by them and the interaction points they have on the way. It could be to the nearby temple, some neighbour or relative's house or the nearby park for a walk or playing cards with friends.
- This can be measured through two methods with different parameters for quantitative & qualitative data.

#### **2.21.1 Spatial configuration**

- Placement of spaces
  - Seating spaces near the entrances and balconies
  - Use of niches and informal dumping area
- Possible interaction between spaces
  - Empty spaces between verandas used as drying spaces
  - Front yard plantations & beautification
  - Area for washing vehicles.
  - Area for street hawkers to sell.
- Dimensions and scale in comparison to one another
- Distance
- Form

### 2.21.2 Spatial cognition

- Perception for space in context of function
- Individual agenda
- Peripheral elements of familiarity
- Sense of awe/ new elements

### 2.21.3 User Group

- All elderly people who can convey their message
- Independent of education level.

### 2.21.4 Context of Application

- Elderly's perception of space
- Use of space for the elderly and how they use it
- Their interaction with the space
- Since the elderly will be taking the researcher around the place, showing their favorite places, and places which they dislike, how they interact with the spaces, etc., it is one of the most efficient methods to do a study on the relationship between a elderly and the space in which he lives.

### 2.21.5 Advantages

- Natural and comfortable:
- Highly participatory
- Elicit lot of information about the place
- Authority to the elderly
- Since the elderly, who are familiar with the place, are taking the researcher for a tour, who is unfamiliar with the setting, the elderly is more comfortable as it is his natural environment. The elderly gets an opportunity to show his way to someone else and take the lead, therefore they feel enthusiastic about it and do not feel afraid being with an outsider.
- Most efficient in groups.

### 2.21.6 Limitations

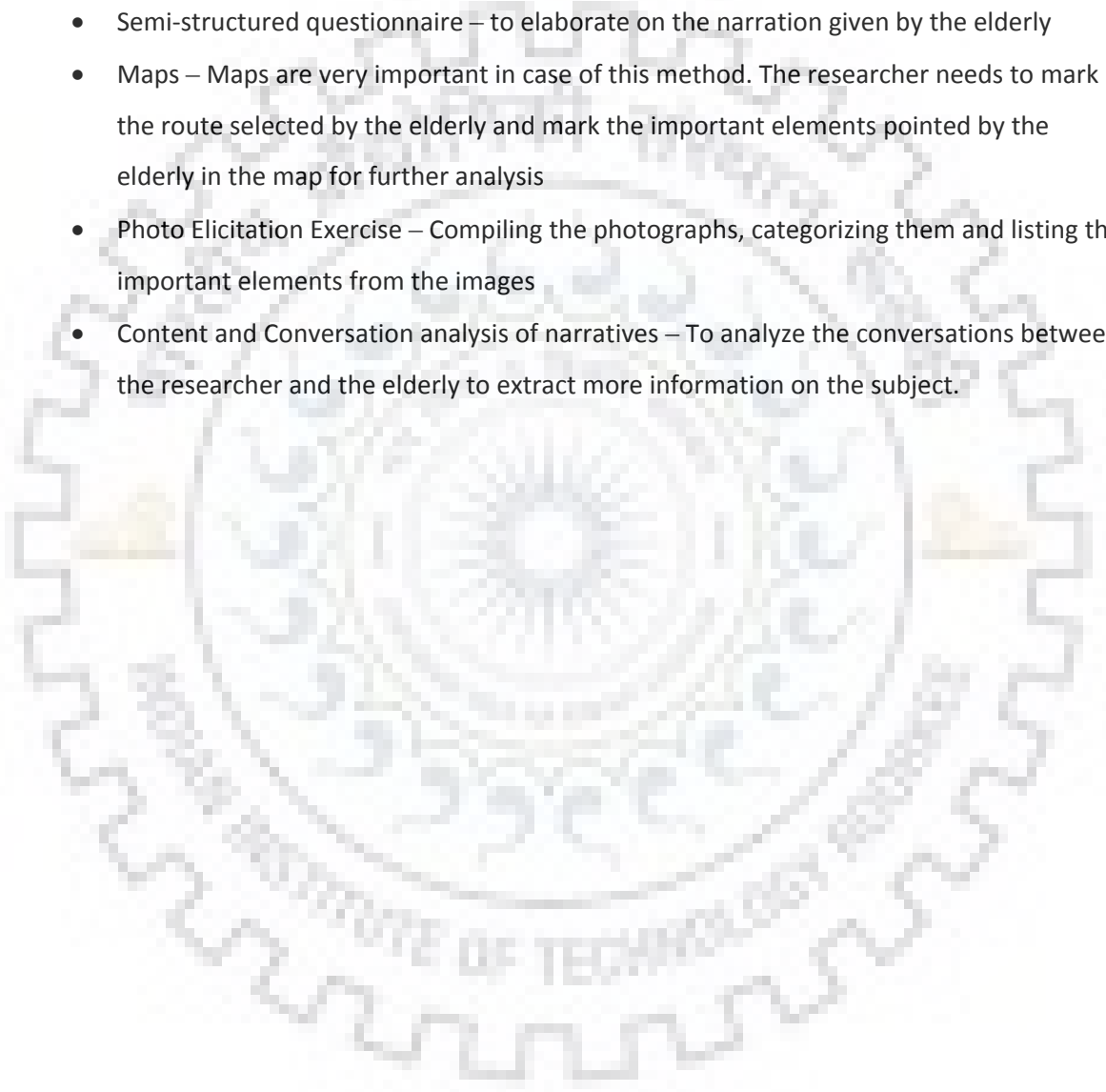
- Elderly may avoid places they fear- this limitation can also be eliminated if the experiment is conducted in groups.



- Success depends on relationship between elderly and researcher- reliability on researcher

#### **2.21.7 Tools for Data Collection**

- Camera – to take pictures of the places shown by the elderly
- Audio recorder – to record the explanations given by the elderly
- Narrative recording sheets: to note down the comments made by the elderly.
- Semi-structured questionnaire – to elaborate on the narration given by the elderly
- Maps – Maps are very important in case of this method. The researcher needs to mark the route selected by the elderly and mark the important elements pointed by the elderly in the map for further analysis
- Photo Elicitation Exercise – Compiling the photographs, categorizing them and listing the important elements from the images
- Content and Conversation analysis of narratives – To analyze the conversations between the researcher and the elderly to extract more information on the subject.





# Chapter 3

## Primary Site Studies





### 3 Primary Site Studies

Case Studies have been meticulously chosen as urban villages of Delhi as their streets are mostly overlooked and are under maintained and encroached without any control on functions allowed on street.

#### 3.1 Site study 1: Ber Sarai

##### 3.1.1 Location

Located right in the heart of south Delhi's education complex i.e. Qutub education complex.

Ber Sarai is located between Old JNU campus & IIT Delhi campus and has been a booming business ground for coaching centres & affordable P.G. rental services but a large chunk of Ber Sarai population is still families living there from many years.

##### Census Data on Ber Sarai

- Population of Ber Sarai- 75,000 approx.
- Percentage of Female population- 43%
- Percentage of male population- 57%
- Percentage ratio of male/female in elderly- 40/60

Major occupation of Ber Sarai population is either some service job or they are students.

Mostly homeowners don't do any jobs and run P.G. rental business or property dealing business.

Ber Sarai is famous for its book market and for being student friendly as it remains active during night as well.

##### 3.1.2 Skeleton of Streets & vehicular connection

- Ber Sarai is well connected through Vedant Desika Marg and recently opened R.K. Puram Metro Station is located at 600m towards north.
- The street marked in yellow is main connector street to Ber sarai from Vedant desika mark.
- It is adjacent to Ber Sarai Park. There is a dump yard at the end of the road right next to the Ber Sarai Park.
- The connector street is mostly used for parking as no house opens on the street.

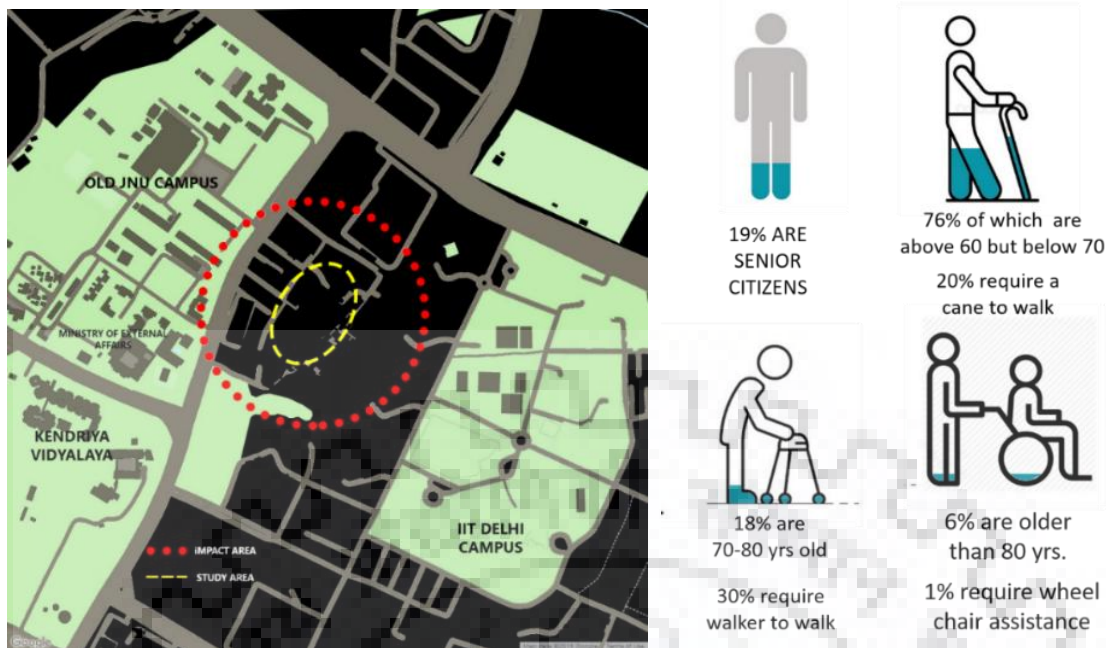


Figure 16 Ber Sarai- Study & Impact area

### 3.1.3 Activity mapping for elderly

#### Walking

Most common activity performed in a street is walking. Elder people go out in street after meals or at night to enjoy weather and burn some calories. Walks as suggested by physician keep the heart healthy and helps in overall physical strength.

#### Socialising

- Dark spots shown in the activity mapping are the spaces where most of the elderly stop and interact with the people or sit and relax. Socializing is one of the major activities in terms of interaction which includes talking about daily life or discussions over political parties.
- Current hotspots for activities include smoking(hookah) points



Figure 17 Ber Sarai- Street hierarchy

- Areas where seating benches are available around park,
- Small park and the houses where street turn so there is an inviting angle in seating spaces for interactions.
- Areas which are highly active have been detailed in following figures



Figure 18 Figure 16 Activity mapping for Ber Sarai



Figure 19 A-PNB ATM with Resident car parking in front



Figure 20 B-View from ATM to market on side

- Street being wider at this point still has minimal usable width because of unauthorised car parking in street.
- The area in front of PG Service is occupied with bikes of student living there. Due to the presence of bland wall in front and a lush DDA park on the other side. Ground floor view entrance is bad.
- Laundry service table becomes the pivotal point for interactions with elderly as he has been working there for 15 years.



Figure 21 Laundry service person space before the narrowing street





Figure 22 Activity point A

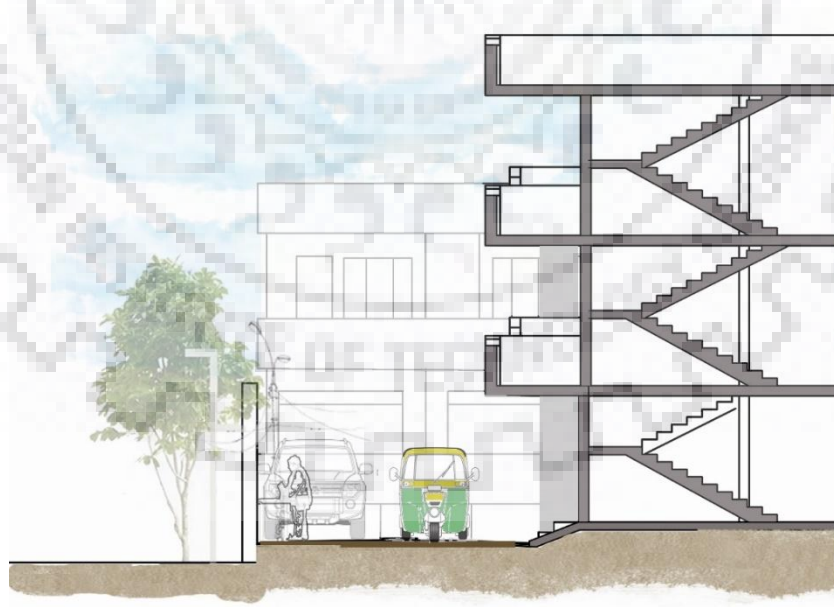


Figure 23 Section of street at A

- Street Width at this section is 4.5m.
- Height of the building is 11m and DDA boundary wall is 2.8 m high.

- Wider street width around ATM gives an opportunity to utilize the space on street sides for seating spaces.
- DDA flats boundary wall blocks the view of the park in front for the people in street.
- Viewing angle to open sky is moderate 140 degree from ground.



Figure 24 activity point B

- Street Width at this section is 2m.
- Height of the building is 13m and DDA boundary wall is 2.6 m high.
- Viewing Angle to open sky is moderate 120 degree from ground.



Figure 25 Plan at C

- Before connecting to main DDA park there is a small park at the end of the street which acts as transitional space



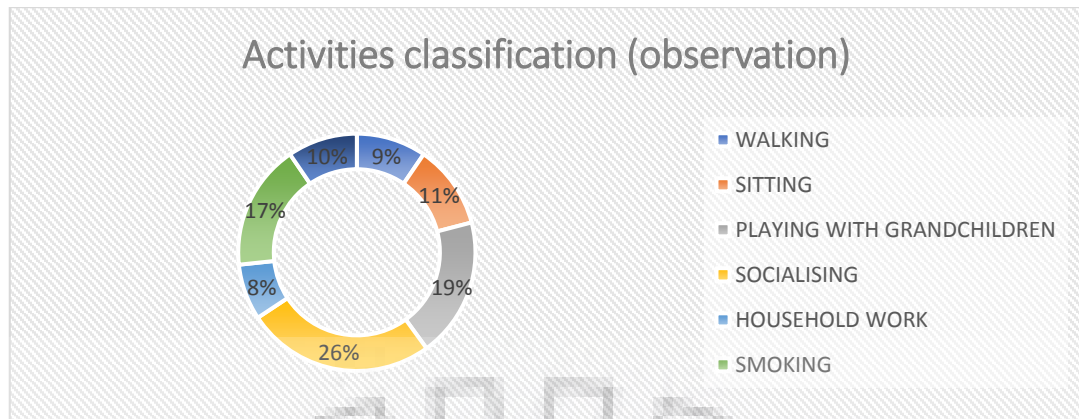
**Figure 26 Section showing park and adjacent street Inferences**

- Buffer open spaces such as shown in fig. 22 above are the breathing spaces for the busy streets.
- These open spaces are not crowded or used for sports activity as they are small and hence are perfect for elderly to relax and rest.
- Buffer spaces like these deter the vehicular traffic to collude just outside the street and decrease the noise level in the street.
- These buffer spaces are uses as multi activity open spaces by the women for household chores through the day.
- These spaces are also used for small functions and gathering as it provides more intimate gathering than the big park outside the community.
- Managing spaces of this size is easily feasible for elderly community rather than a big park which has many other issues for maintenance.

#### **3.1.4 Elderly Survey (Ber Sarai, New Delhi)**

Semi structured interviews with interview schedule.

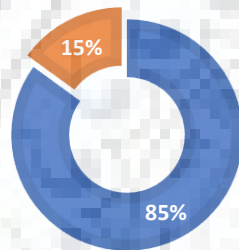
- Interview was taken with 30 elderly people with questionnaire filled over their responses in semi structured interview.
- The time period of residence for elderly is more than 20 years for most people in the area.



### Gender Ratio for Basic activities (Observation).

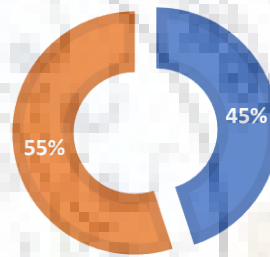
#### WALKING

■ Men ■ WOMEN



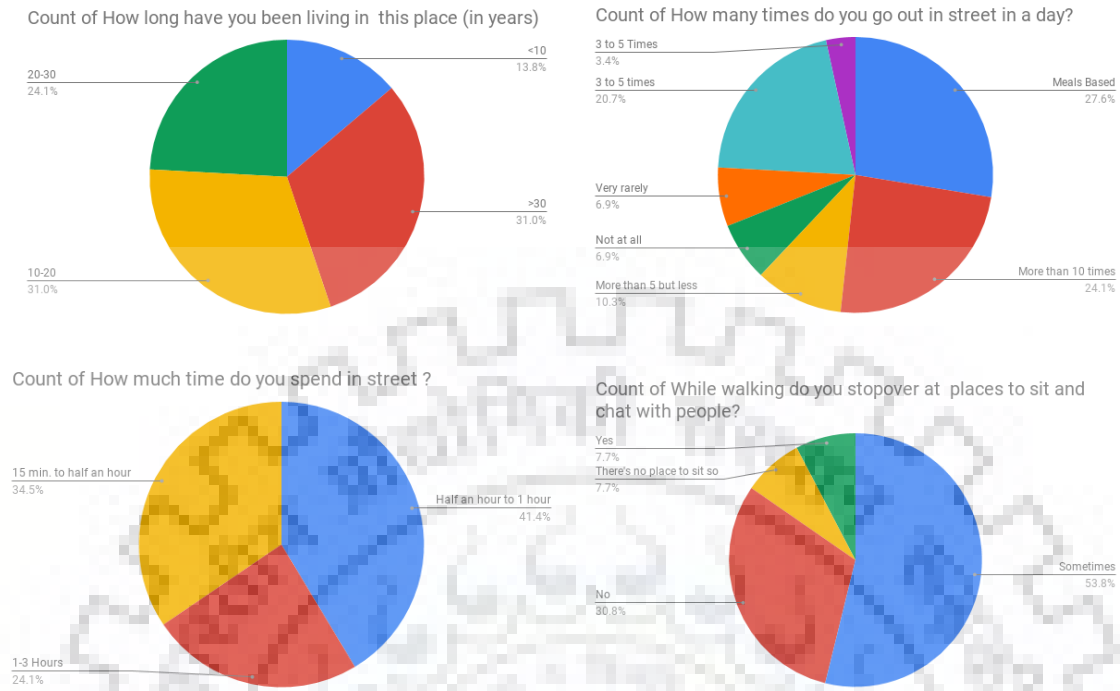
#### SITTING

■ Men ■ WOMEN



- Most of the interviewee are from Haryana & Bihar region.
- 90% People living there from more than 10 years live in a joint family.
- Elders with more than 30 years of residence are mostly grandparents living with son & his nuclear family.
- Literacy rate for above 30 years of residence is very low hence they mostly depend on people of same community for socialising (Source: Census 2011).
- Elderly women have literacy ratio of less than 5 % (Source: Census 2011)

3.1.5 Inferences



- Approx. 60% of people sit outside their friends’ houses to interact so occasionally seating spaces are required outside houses.
- 64% people spend more than half hour outside their houses out of which 10 min. is the time to walk from one place to another so time spent in recreational activities like socialising, smoking and playing is 20 min. to 3 hours for 64% people.
- Elderly who spend more than one hour are socially or go out with their pets hence they can be enrolled into programs for community participation programs.

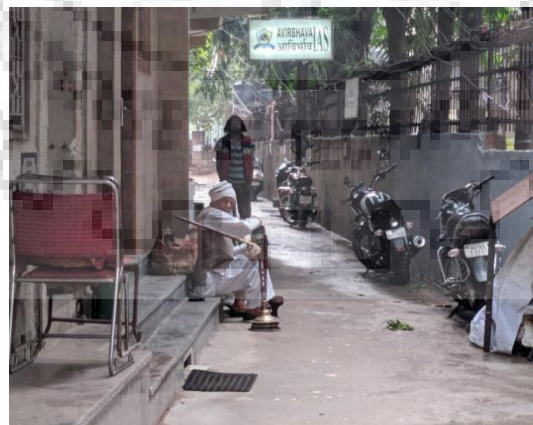
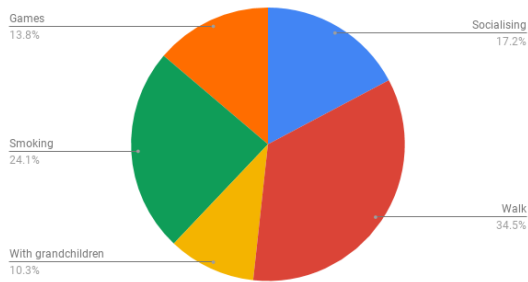
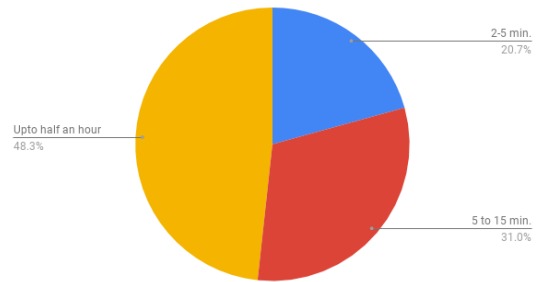


Figure 27 Elderly person sitting outside smoking hookah

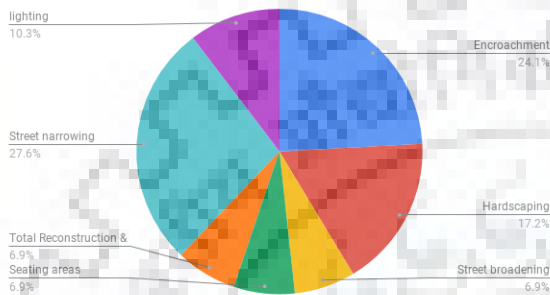
Count of Major Activity you go out in street for?



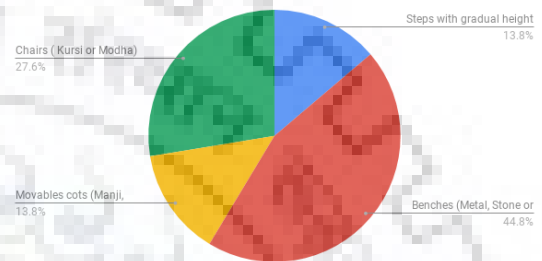
Count of How much time do you spend in these stopovers



Count of What changes they have seen in street infrastructure?



Count of What are the types of seating spaces do you like in street?



- Street narrowing is the biggest issue everyone has noticed.
- Encroachment being second prevalent issue is due to shops taking up extra spaces for steps in front resulting in houses using the residual spaces for bike parking.

Katwaria Sarai



Figure 28 Bikes parked ahead of encroached shops

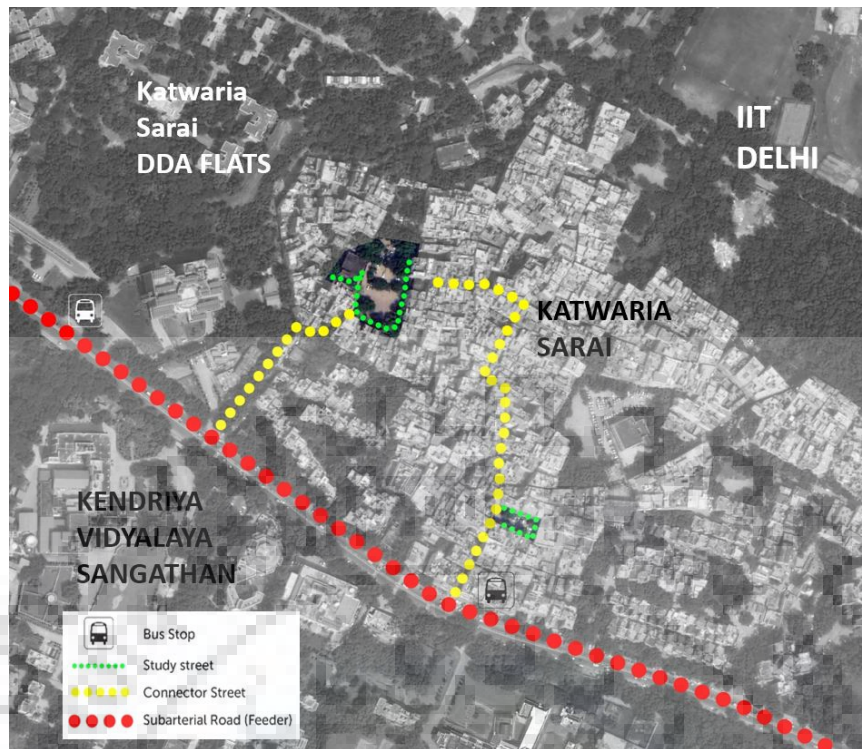


Figure 29 Location & Street hierarchy map

3.1.6 Location

It is Located in south Delhi’s education complex i.e. Qutub education complex adjacent to NCERT complex and IIT Delhi.

It has a history of water wells & parks and every park has a well in it.

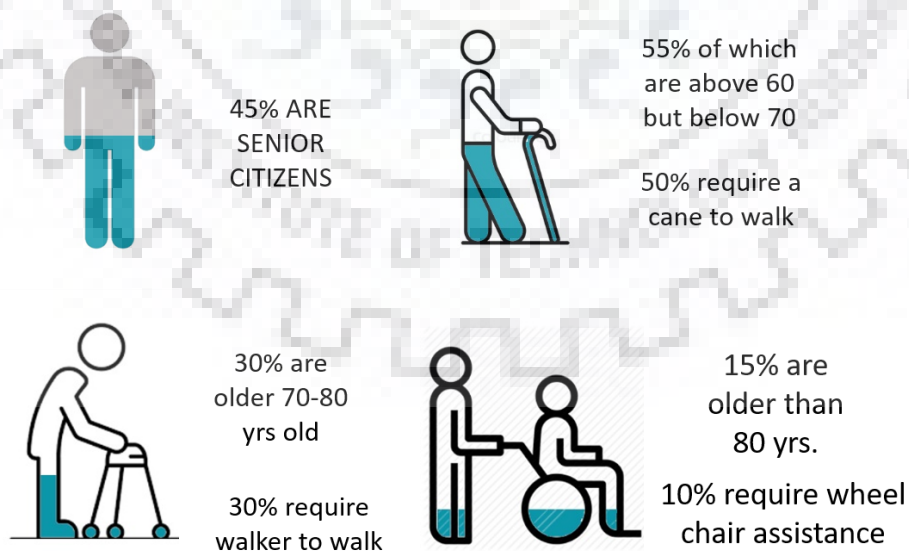


Figure 30 Elderly Census Data

Source: Census 2011



- Percentage of Female population- 43%
- Percentage of male population- 57%
- Percentage ratio of male/female in elderly- 40/60

### Occupation & character

- Major occupation of Katwaria Sarai population is renting and managing PGs for students who come for UPSC exam preparation.
- Mostly elderly homeowners don't do jobs and run P.G. rental business or property dealing business.
- Every year thousands of migrant students come to prepare for UPSC & other competitive exams.
- Katwaria Sarai is mostly known for its all-night open food joints & student centric services.

#### 3.1.7 Study & Impact Area



**Figure 31 Impact Zone**

- Impact zone of Major site is larger due to unavailability of other big open spaces around hence the intervention on the site would have impact on a large no. of users who come from up to 200m of distance from the selected site.

- Minor site has smaller impact zone as there is an open space available at more than 100m for people to utilize and the reason for which minor site is mostly used is for religious purposes and parking in current scenario.
- Width of street Varies from 2m to 4.2m.
- Surface of park is significantly higher than the street level hence experiences flooding in monsoon.
- Unlike other street in study. Street has a lot of trees along the length.
- **Viewing angle to open sky** is moderate **160 degree** from ground as compared to inside streets which have high **110-degree** angle for open sky.



Figure 32 Street site plan with adjacent community park



Figure 35 Wide Street Site section with adjacent Park

Figure 34 Section with Katwaria Gumbad

Figure 33 Section with Community Centre compound



Figure 36 Location Plan



Figure 38 Plan A



Figure 37 View of A

- The broad porch visible in the picture is unauthorized encroachment to put temporary garment shops outside.
- Dead end of the street is used as debris dump since its least accessed at any time.
- Area around point B is mostly occupied with bike parking.

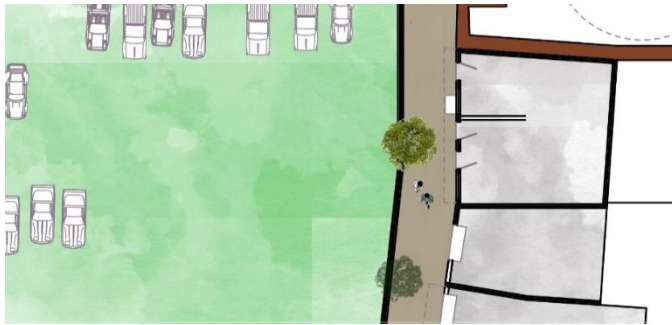


Figure 40 Plan at B



Figure 39 View at B

- People utilize the space outside the house to put up chairs to sit and relax. Street is also used to dry clothes as it gets direct sun in the afternoon.
- Elderly ladies also do household chores (as visible in the picture above) while they are outside.



Figure 42 Plan at C



Figure 41 VIEW at C

- Elderly people also use street as socialising space. They put up chairs outside to sit, talk and play games.
- Trash dumping and found smell of trash is a big issue (as seen in the picture above)



Figure 43 View of park and Salvage Dealers shop

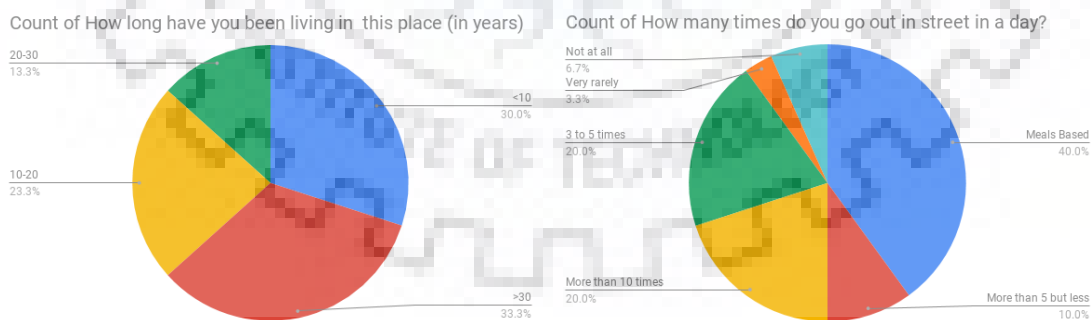
- Park has been encroached by residents for parking as well as salvage dealers for keeping scrap and old cars.
- Park is still used by residents and children for walking dogs, playing and sitting around the corner trees.
- Street is also encroached by the salvage dealers for keeping the scrap they collect over the day.



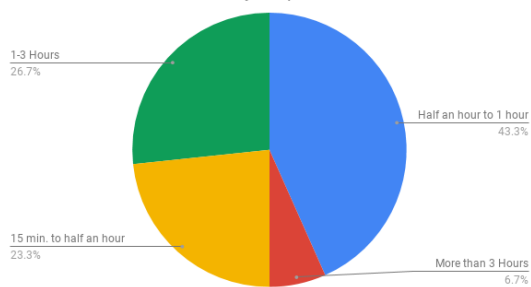
Figure 44 Street view with encroachment from shops & houses

- Streets even being encroached to its brim is still used for interactions actively due to the presence of large open space as well as overall greenery on the street.

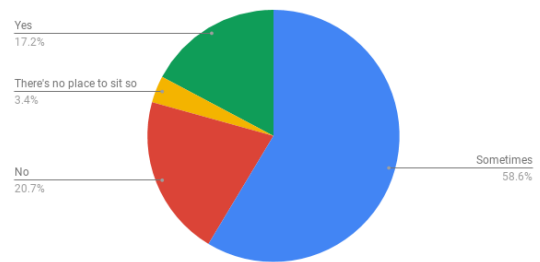
### 3.1.8 Elderly questionnaire survey (KATWARIA SARAI)



Count of How much time do you spend in street ?



Count of While walking do you stopover at places to sit and chat with people?



### 3.1.9 Inferences

- Due to lack of vehicular parking control street has been overly crowded with the parked two wheelers hence becomes a difficult to be used by an elderly because of obstructions they create.
- Vehicles of all type ply on such small street because of parking in kids park hence street remains unsafe because of moving vehicles.
- Steps outside residences are used to sit and chat but due to different level of step for every house. They can't be easily used by elderly because of physical problems.
- Park space should be utilized for recreational purpose as it is a strength of the street and has a large amount of trees.
- Community Hall space provided by MCD is not being used other than marriage or official purposes.

### 3.2 Site study 2 :Munirka



Figure 45 Munirka Street Site Location Map

#### 3.2.1 Location

Munirka is located on Olof Palme Marg near Vasant Vihar and R.K. Puram. It has many C.A. coaching centres where students come to study for competitive exams. Munirka is also popular for renting P.G. for student who study in Ber Sarai as it is cheaper in terms of rent.

- Majority of population living in Munirka is from Northeast India.
- Most of them work in and around Vasant Kunj malls in service jobs.
- Natively landowners in Munirka are from Haryana.
- 30% of elderly population is from Haryana whereas rest 70 % are from other states.



27% ARE  
SENIOR  
CITIZENS



62% of which  
are above 60  
but below 70

50% require a  
cane to walk





Figure 46 Elderly Census Data

- Percentage of Female elderly population- 41%
- Percentage of male population- 59%

### 3.2.2 Study and Impact Zone



Figure 47 Study and Impact Map of Munirka

- Impact zone in Munirka Site is much larger as there is no open or transitional space available in whole area.

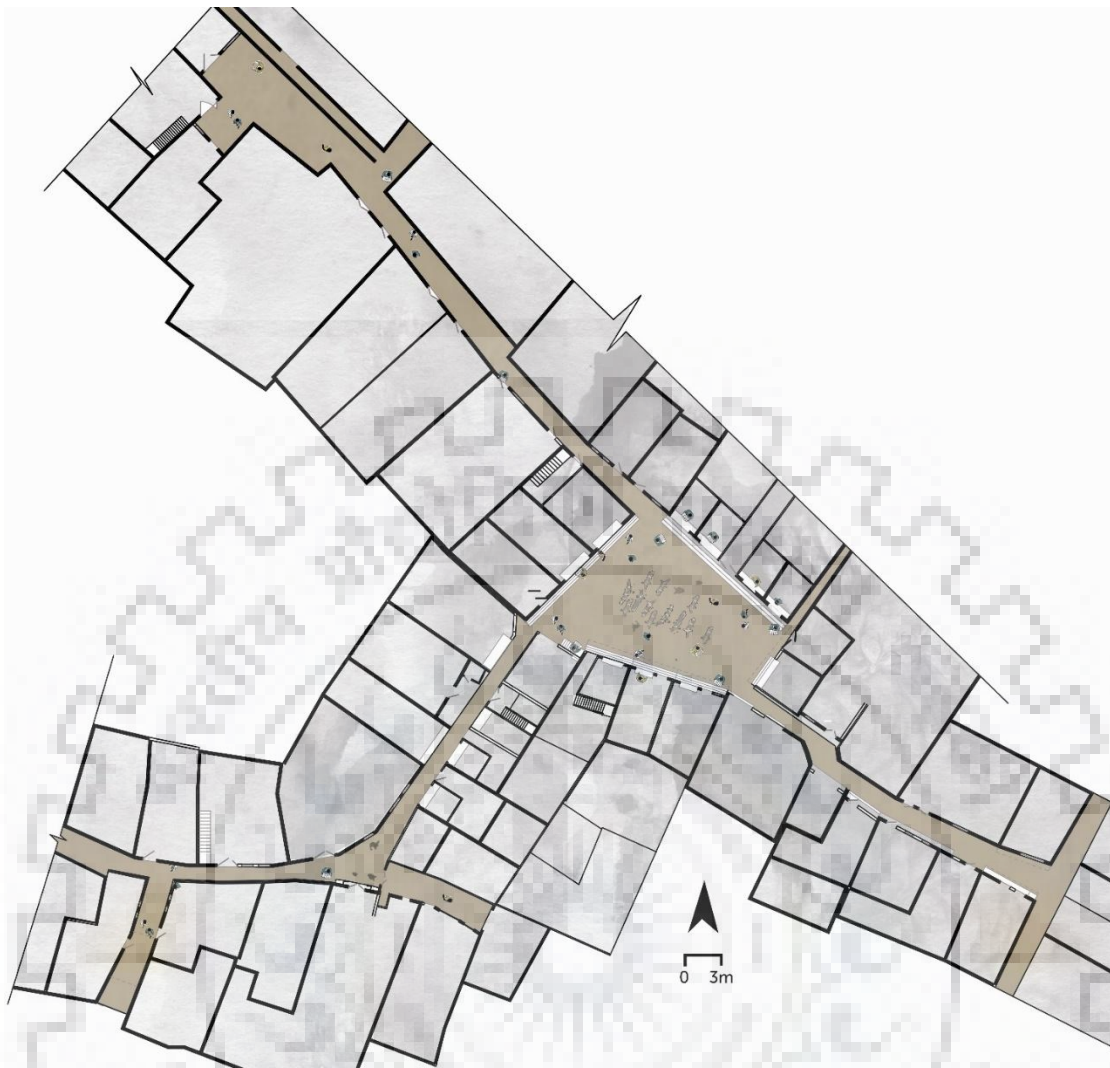


Figure 48 Street Site Plan

The area chosen is prime commercial area hence there is lot of footfall as well as traffic.

- Site Location is intersection of street in one triangular transition space.
- Three Streets connecting the space have variable widths.
- Since all the houses open in the same direction there is always passive surveillance in the central area.
- Central space is mostly used by residents for unauthorised bike parking.

### 3.2.3 Activity mapping

- The most prevalent activity in the street is people standing around to buy things.
- Elderly people face problem to come to this street as it is too crowded and bike parking obstruct the movement even after having so much space in the centre.

- Steps in front of shops have ample space to sit and many shops stay closed at different times of day hence there is always some seating space available.



Figure 49 Closed Shops with seating and standing space in front

- Two streets connecting to the central space have dead ends hence have less vehicular traffic.
- Dead end streets are preferred by people to sit and smoke.

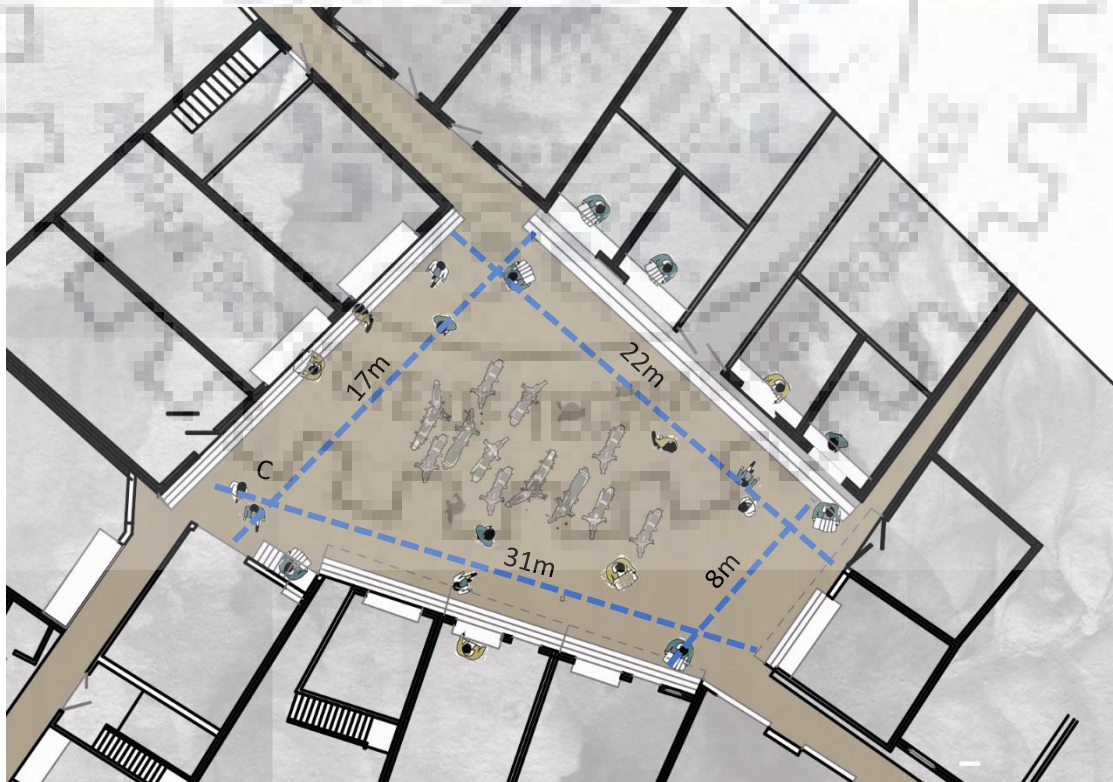


Figure 50 Centre court panorama view (taken from c point shown above)

- Central space is owned by no one and has no regulation and as per the data collected people keep on encroaching into the court more and more with every new construction.



Figure 51 Centre Court Dimensions

- A definite function which is better than an informal bike parking should be allotted to the space.



- Space has a lot of potential in terms of acting as central courtyard to the community in general but currently it is being used as a parking space.
- Aesthetics of space is also cluttered by the bike parking in centre.
- Efficiency of street decreases as it is hardly able to take any sort of vehicular traffic after bike parking.



**Figure 52 Dead end street encroached by residents with boundary walls and cantilevers**

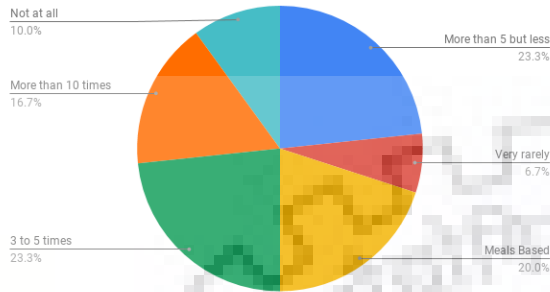
- Incidental spaces are being encroached by residences for personal parking rather these spaces can be utilised for interaction spaces for elderly as they experience negligible traffic hence are very safe
- Semi Covered spaces can be used in summers for seating spaces and small events for elderly society in streets.



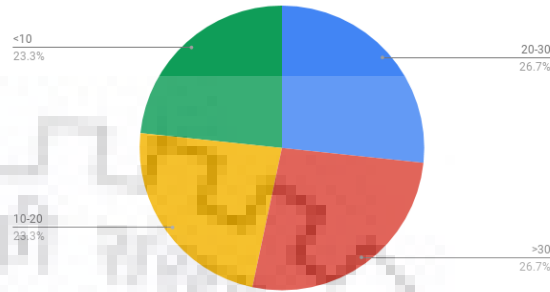
**3.2.4 questionnaire**

- Elderly questionnaire survey (Munirka)
- Sample size -30 individuals

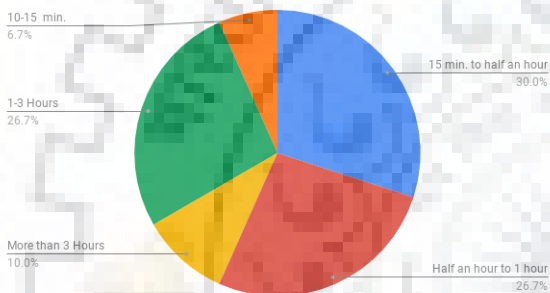
Count of How many times do you go out in street in a day?



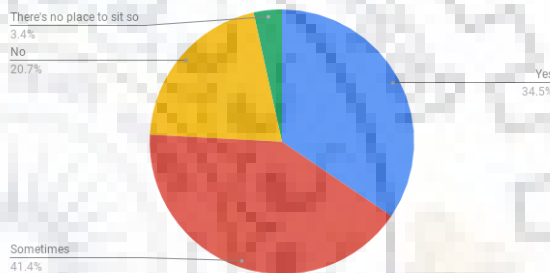
Count of How long have you been living in this place (in years)



Count of How much time do you spend in street ?



Count of While walking do you stopover at places to sit and chat with people?



- In Munirka elderly people spend a lot of time outside since population of kids also is large in Munirka and grandparents take grandchildren to the park which is far from currwnt location

### 3.3 Site Study 3: Vinod Nagar (Mandawali)

The street is located in West Delhi (vinod nagar) near Laxmi nagar. In socio economic perspective Mandawali is a low income group area.

- Nearest public transport is DTC bust stand at 300m
- West vinod nagar metro station at 500m.



Figure 53 Location and proximity to west vinod nagar metro station

- Major occupation of the people living in mandawali is service jobs in Noida
- Most of the interviewee are from Uttarakhand ,kumaon and Garhwal region.

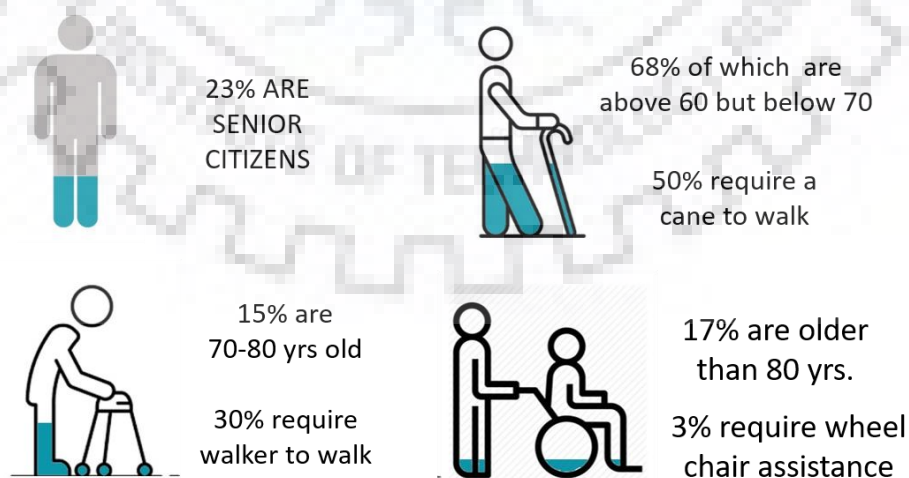




Figure 55 Street map



Figure 54 Park at the entrance on both sides and hospital ahead at right

- Street is scarcely populated as the main drainage line goes from this street.
- Population of Mandawali is 60,000
- Elderly population male female gender ratio is 55/45. Street is directly connected to the road and has Kids Park at the entrance of street.
- Street also has a hospital at 100m mark
- Street is very active at the entrance but grows dull as soon as we get ahead in the street.
- Reason of less activity further is the condition of street and open drainage which makes street very difficult to bear.
- Street gets flooded every monsoon and stays muddy throughout the year.
- Architecture of the street is also very haphazard. Conditions of some houses is very bad as they are not well maintained.
- Though there is a high percentage of elderly living in this area, most of them keep having health problems.
- Garbage disposal is also a big problem.



- Sewage runs in the street when people clog up the garbage in open drain and street gets infested with mosquitoes.
- Insects and mosquitoes also become a deterrent for elderly to avoid interaction in street.



Figure 56 Street crossing at junction 1



- Junction one n street is mostly flanked with grocery shops.
- Street on the left goes to Goswami colony which is the Upper middle-class colony of the place.
- Goswami Colony Street Is the only well-maintained street in whole area.
- This street has traffic also as all the vehicles for inside streets pass from this junction.
- Street has been made well but still it has open drainage which ruins the whole experience of street as the garbage flows over from mandawli to this street.

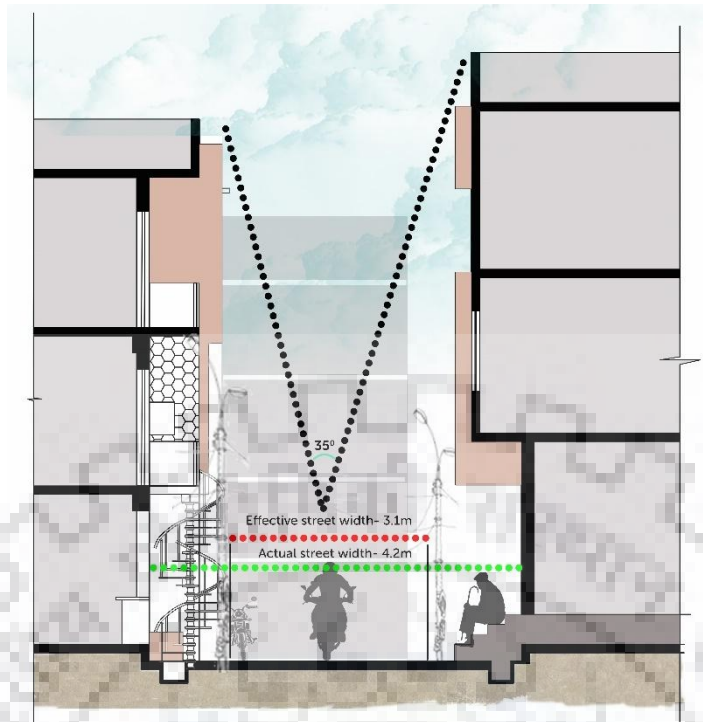


Figure 57 Section A at junction 1

- Encroachment level on this part of street is very high due to presence of shops which extend their display area 1 to 1.5 m in front of their shops.
- Some houses have extended the spiral staircases in the encroached area which further decreases the pedestrian area to walk along the street.
- The open sky visibility cone is just 35 to 40 degrees and hence feeling of openness is very less.

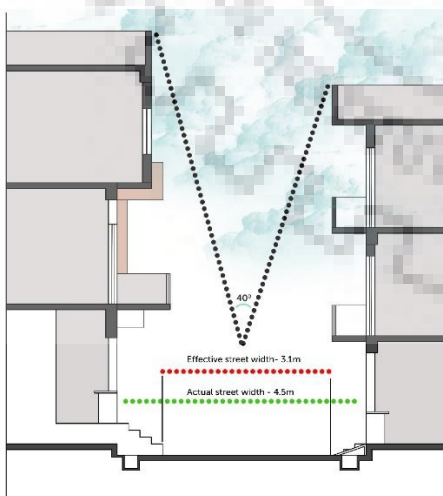


Figure 59 Section B at junction 1

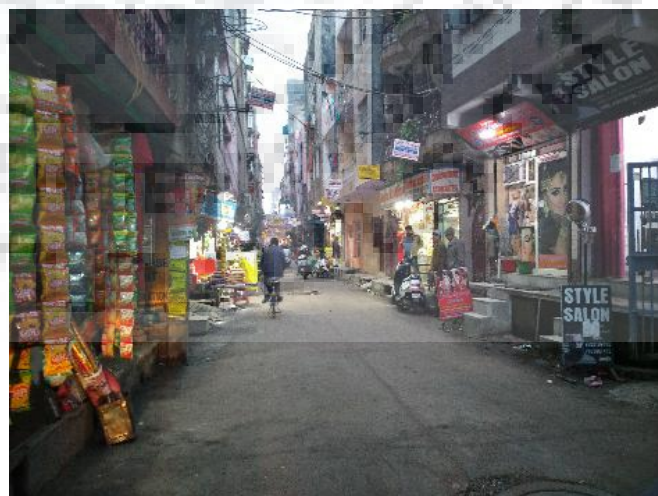


Figure 58 View at section B

- Main street is a little wider and is less encroached with wider open sky vision cone.

- Being wider and being Main Street, it also caters to high traffic and due to less artefacts speed of vehicles increases which makes the street more dangerous.  
Elevation 1



Figure 60 Street part plan for elevation



Figure 61 Elevation one part 1



Figure 62 Elevation one part 2

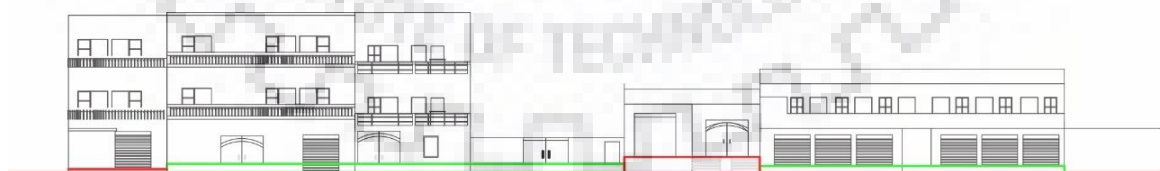


Figure 63 Elevation one part 3

- As visible in elevation above street façade has staggered balconies as well as different heights of steps outside the house on ground floor

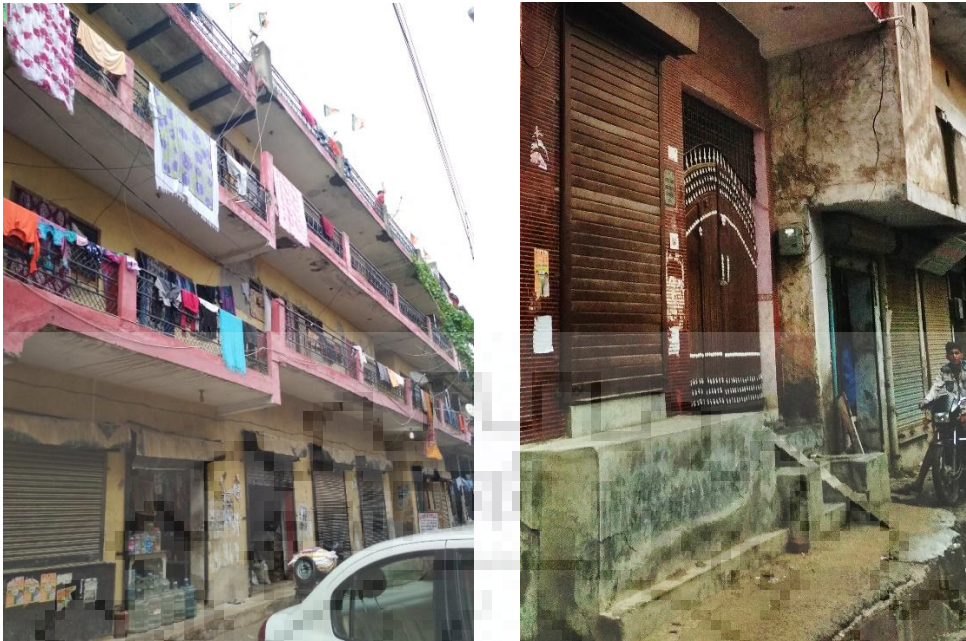


Figure 64 Uneven Balconies and entrance steps

- Different heights of balconies is aesthetically jarring as one cannot make an order as it looks aesthetically unpleasant.
- Different height of steps outside houses make it difficult for elderly to have a proper height to sit while walking in street.



Figure 65 Elevation one part 1 banded façade



Figure 66 Elevation one part 2 banded façade



**Figure 67 Elevation one part 3 banded facade**

- For improving the façade as well as the function of steps on the ground floor. Façade can be divided into metal frame bands and that way every house will have some order of façade.
- These bands can be decorated with planters so there is evenness in façade.
- Making all the steps at ground floor of same height looks good aesthetically also and will provide even comfortable height for elderly to sit.



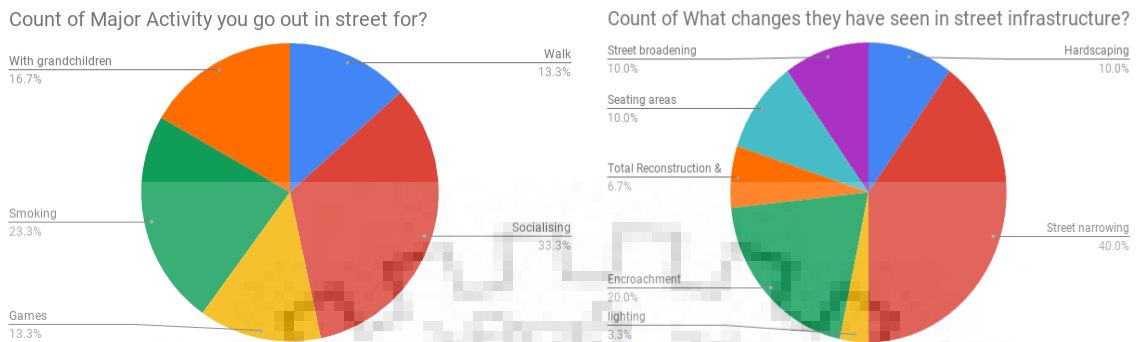
**Figure 68 Proposed elevation**



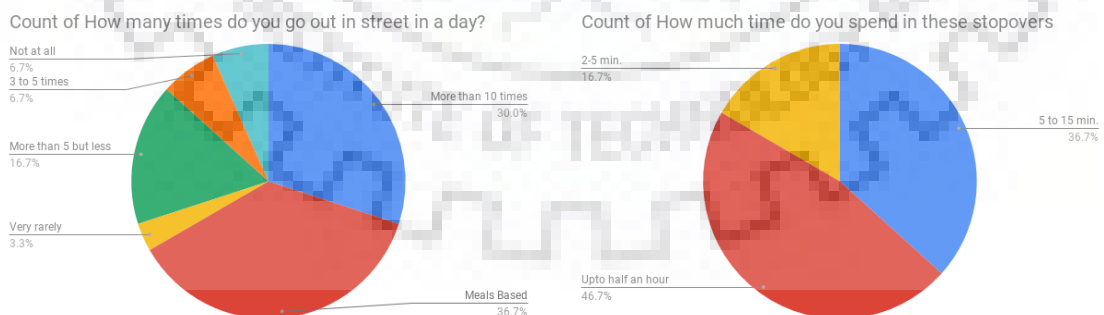
### 3.3.1 Elderly Survey Questionnaire

- The time period of residence for elderly is more than 20 years for most people in the area.
- People living there from less than 10 years mostly live in a joint family.
- Elders with more than 30 years of residence are mostly grandparents living with son & his nuclear family.

- Literacy rate for Elderly above age of 65 years is very low hence they mostly depend on people of same community for socializing.



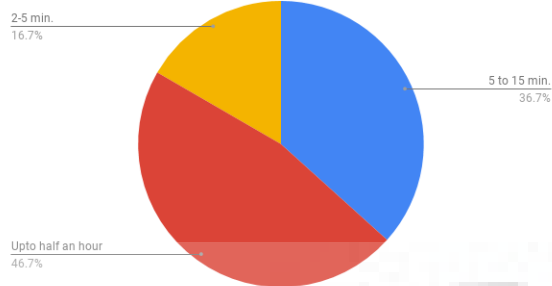
- Most of the interviewee agreed that the street narrowing is the most prominent thing they have seen over the time.
- Impression of street narrowing also comes from the issue which they have mentioned is car parking in the streets.
- Movement of cars & fast-moving bikes in the streets have made their activity in the street uncomfortable and unsafe.
- Mention of encroachment by the extended shops and no seating spaces in front of the houses was also mentioned.
- Most of the elders go out to walk after meals.
- There is a large no. of elderly women who go out often to meet their friends more than 10 times in a day.
- Elderly who rarely go out of their house are either differently abled or sick.



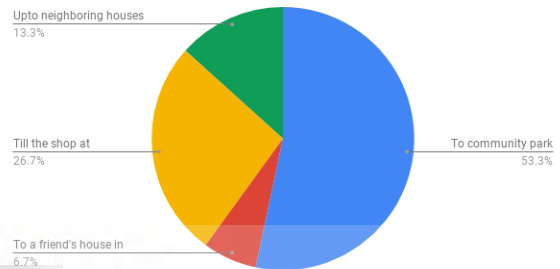
- Majorly men go out for smoking & women go out for socialising as per the interviewees.
- Elderly play Games like playing cards, chess & ludo in winters.

According to previous two charts people who sit around their friends house chat for long time hence need to have proper seating around the houses.

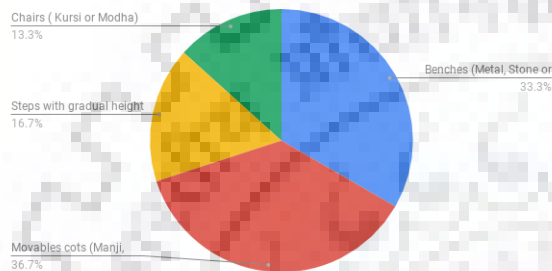
Count of How much time do you spend in these stopovers



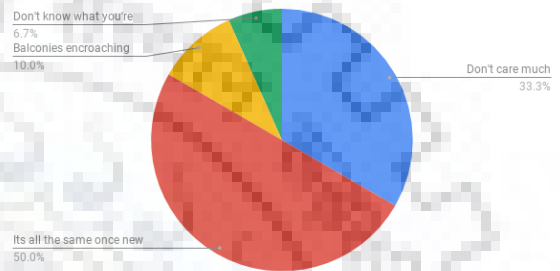
Count of What is the distance you cover when you go out in street?



Count of What are the types of seating spaces do you like in street?



Count of How well do you connect with the facade of the street?



- Seating benches made out of wood is preferred by the elder as told in interview since they don't get extremely cold in winters unlike metal and stone benches.
- Many people prefer to have the freedom of putting their cots out to sit and chat as it is more flexible and it helps them in doing household chores.

### 3.4 Challenges in Research with Elderly People

#### 3.4.1 Relations and interactions

In terms of making relation with senior sometimes it's difficult to get on the right foot with them as the thought process is quite different. Keeping conversation brief, crisp & relevant becomes a little difficult as sometimes they want to project their life experiences which are useful but maybe irrelevant to the research purpose.

#### 3.4.2 Informed Consent

Informed consent means that participants enter the research project voluntarily, understanding the nature of the study and the danger and obligations that are involved. When elderly are asked to give informed consent, they must be given enough information in a language understandable to them to allow them to make an informed decision about participation. It is important that they comprehend the purpose of the research, what the research involves, what is going to happen and for how long.

### 3.4.3 Protection of confidentiality

Confidentiality in research means that unless otherwise agreed to, the participants' identities should be protected so that the information collected does not embarrass or in other ways harm them (Bogdan & Biklen, 1998). There is a universal agreement that researchers should ensure that the participants are not at risk of becoming hurt, and confidentiality of all data is a fundamental part of respecting and protecting the participant in any study. The situation is certainly the same when elderly is involved.





# Chapter 4

## Conclusion





## 4 Conclusion

### 4.1 Strategies to make streets elder friendly

#### 4.1.1 Through Direct Observation

- Street path condition can be made better with less potholes and abrasions to avoid any hazard
- Sudden level changes and obstructions caused by the exterior component of houses can be curbed through control on encroachment.
- Lack of adequate light at night time deters the usage of street infrastructure at night time.
- Aesthetics of the streets can be marginally improved with affordable solutions to encourage the involvement of elder people out in street.
- More seating spaces can be provided according to the maximum walkable distance upto a point by an elderly.
- Rejuvenation of existing small open spaces in surrounding places.



Figure 69 Open air gym in Ber Sarai park used by elderly

- Curbing the problem of mosquitoes and other insects in the streets by abolishing open drainage and unhealthy disposal practices.
- Reducing the traffic in streets by controlling the types of vehicles that can access a certain width of street.
- Public conveniences in location where it can be provided with accessibility features to cater the elderly who have problems like incontinence etc.

- Street calming measures by plantation and other materials so that the noise image of street can be changed in mindset of elder people.

#### 4.1.2 Through survey and questionnaire

##### Negative attitude towards going out

Most of the elderly which don't go out in street have a negative perception towards street about being not social or harsh outside environment

- Through availability of spaces for elderly to interact misconception regarding outside activities can be curbed and more of the elderly population can be involved in street activities.
- For e.g. Currently women in urban villages don't go out far in open spaces for recreation purposes as its discouraged and they have lack of orientation about activities they can get involved in.

##### Fear

Fear has been one of the most prominent reason for being inactive in streets for elderly. Most of the elderly who were interviewed mention one or other friend or relative who met an accident or was left helpless by some medical situation

- For this problem multi-pronged strategy is required.
- For accidents more robust street infrastructure as mentioned in direct observation is required.
- For fear of being helpless on street the activity level of street has to be improved to provide passive surveillance.
- Fear as mentioned by psychiatrist Dr. Shally kukreja can also be curbed through providing spaces to people that make them feel familial and comfortable with activities they like to do. The encouragement to do an activity one likes overcomes the fear or shyness for going outside.

##### Individual Agenda

As per observation and interviewing the elderly people it was recorded that they have preferences which are starkly different from each other many times. Some Old people love to play with their grandchildren or other kids hence it becomes a motivator for them to go out.

- Fitness infrastructure can be provided in kids' park for elderly as they both can take advantage of the time they share with each other.

Elderly men who go out for smoking have an acute liking towards doing it in groups while chatting and discussing current affairs hence spaces for them can be specifically provided which do not hinder the other's convenience.

### **Lack of skills**

- On being interviewed about lack of engagement in any productive activity the common answer was lack of skills in elderly according to current world.
- Skill programs can be started in the community center like construction workshops & carpentry so elderly can engage themselves and contribute to the society through the generated product

## **4.2 Intervention Planning**

### **4.2.1 Phase One**

Redoing the pavement into grass pavers for street as recommended in case studies.

1. Advantages of grass pavers
  - Grass pavers keep the street cooler than concrete paving
  - Grass pavers are less impact prone if an elderly falls
  - Grass pavers have more noise buffer than the regular concrete for noisy streets.
2. Making primary seating spaces at resting intervals.
3. Providing sufficient street lighting especially around the seating space to make the usage safe at night.
4. Providing complementary seating benches in buffer spaces to encourage interactions in transitional spaces.
5. Establish data collection framework & agency with help of Social justice department of India as they provide assistance for welfare schemes for elderly.



Figure 71 Wooden bench



Figure 70 Metal bench



Figure 72 Cement bench

4.2.2 Data collection and analysis from phase one

- Assimilate and analyze the data for functioning of primary resting seating spaces as per activity requirement. If more are required take feedback.
- Collect direct observation data to verify the activity level around seating spaces and which spaces are dormant.
- Level of comfort data regarding seating material to be collected as feedback.
- Problems with surface texture and surface temperature difference to be collected as data.

	Men Smoking	Men playing cards	Men walking dogs	Men with grandchildren	Men Walking dogs	Women household work	Women socialising	Women with grandchildren
Men Smoking	1.0							
Men playing cards	0.0	1.0						
Men w alking dogs	0.2	-0.4	1.0					
Men w ith grandchildren	-0.3	0.0	0.3	1.0				
Men w alking	-0.3	0.0	0.0	-0.1	1.0			
Women household work	0.2	0.2	0.1	0.3	0.5	1.0		
Women socialising	-0.4	-0.2	0.0	-0.3	0.0	0.2	1.0	
Women with grandchildren	-0.4	-0.3	-0.6	-0.4	0.2	0.3	0.3	1.0

Figure 73 Activity & mutual comfort correlation analysis

	Seating Height	Seat depth	Backrest height	Backrest angle(in degrees)	Armrest height(from seating)	Lumbar support
Metal Bench	430mm	390mm	420mm	103	180mm	No support
Wood Bench	440mm	430mm	450mm	105	180mm	Mild support
Cement Bench	425mm	440mm	460mm	114	Not Present	Ample Support

Figure 74 Benches Measurement data in Urban Villages

	Men walking dogs+ Men with grandchildren+ Men Walking+ Women with household work	Men Smoking+Men playing cards	Women socialising+Women with grandchildren
Preferred Seating Height	430mm	430mm	410-430mm
Preferred Seating backrest	420mm	350-450mm	350-380mm
Recommended Seating backrest Angle	102-105	105-110	103-108
Preferred Armrest Height	120mm (helps in drying clothes & seating children also)	Not preferred	110-130mm
Lumbar support preference	Required mostly because of high activity level with dogs &	Not required due to hunchback position	Required as they sit for long hours

Figure 75 Seating preferences according to comfort level grouping in fig. 58

- Choices of material should be presented to the users
- for better identification.
- Preference of resting spaces over complementary seating spaces in transitional spaces to be recorded.

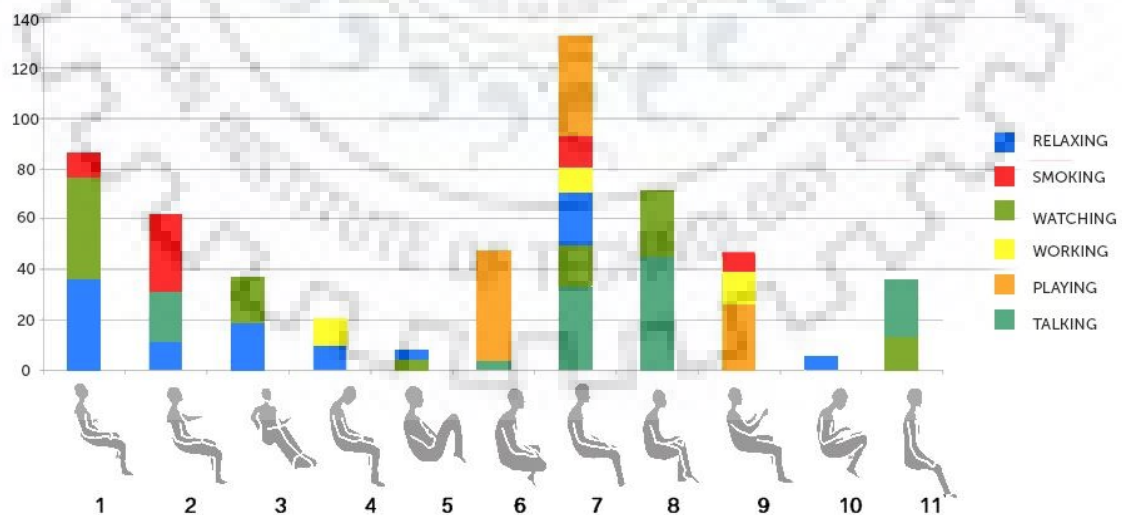


Figure 76 Seating postures activity & time graph

- As observed in the field study, few postures are more preferred and has a functional aspect to it regarding view and orientation.
- Major activities in most preferred posture is talking, relaxing and playing

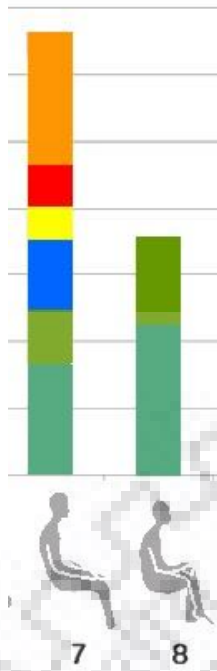


Figure 77 Most preferred seating arrangements

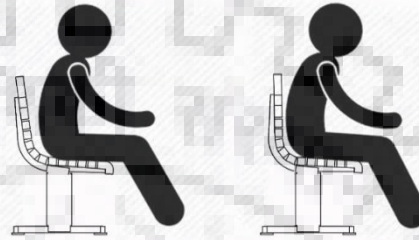


Figure 78 Seating backrest and seat angle options

- Seating types can be divided into with backrest and without primarily.
- In backrest seating benches the angle of seat and the angle of backrest affect the comfort and healthy posture alignment of the elderly up to a great scale.



- Without backrest seating is very deterrent for elderly at times because of lack of resting position.
- Even a slight lumbar support at the edge helps a lot in terms of comfort.
- This kind of seating induces unsafe seating experience as users are always conscious about falling back if they lean behind.



- Backrest at an upward angle is not preferred by elderly for two reasons. First it becomes difficult to get up from such an angle if a persons' weight is more.
- At this angle sitting for long time is not advised as the weight of a person points directly on lumbar region and can result in severe back problems.
-





- This bench type design has problem as the angle of seat forward pushes a person ahead and creates lack of lumbar support which results in muscle fatigue in long duration seating.



- This bench design type with seat level at flat horizontal and seating angle as provided in tables in fig 69 is preferable for elderly as it provides ample lumbar support, this design pushes people sitting forward due to angled seating and makes the fell comfortable as well as safe in balance.

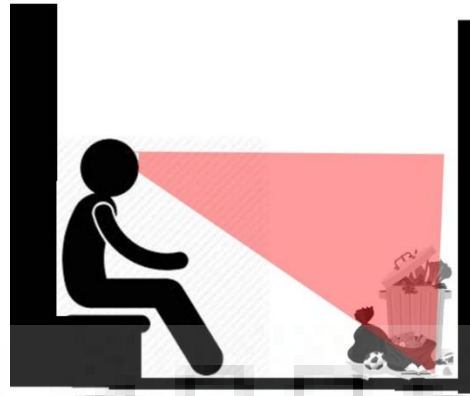
#### 4.2.3 Phase Two

- **Additional seating spaces** as per data collection should be provided and **dormant seating spaces** be removed if needed.
- New material for seating space if any as agreed upon, should be used.
- Lighting quality requirement should be taken as feedback which should include **type of light (LED or incandescent), Intensity of light & colour temperature.**



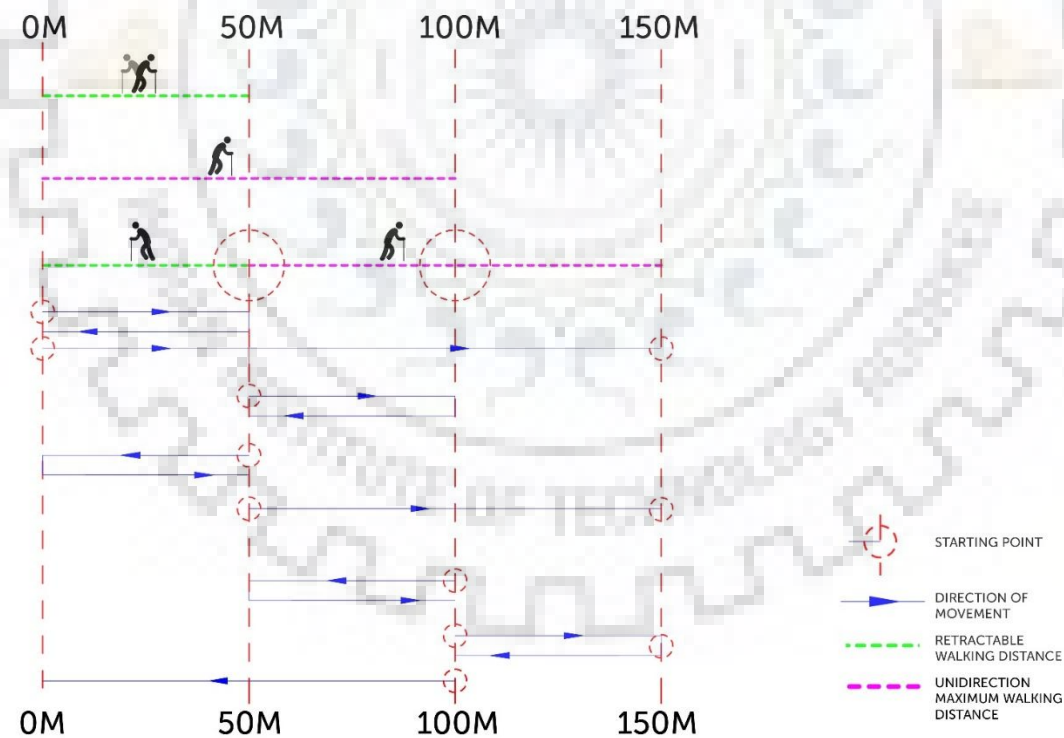
**Figure 79 Comfort issues with light intensity & colour temperature**

- Problems regarding current resting spaces in street should be identified in terms of factors that create dormancy of those seating spaces. Like, placement in way vehicular traffic, dark areas at night or bad view.



**Figure 80 Feedback regarding problems with seating provided**

- Additional requirements such as extra lighting points & water points should be provided as suggested by the users.
- Activity hotspots should be identified and the factors of their success should be noted  
Maximum walkable distance with comfort for back & forth journey is 50m and single length is 100 m



**Figure 81 Seating point to maximum walkable distance calculation**

Maximum walkable distance with comfort for back & forth journey is 50m and single length is 100 m

Since maximum walking distance is 100m and considering the point that at both ends of the street there is a resting space at intersection the no. of seating points can be decreased to one in 150m distance rather than 2 points.

As shown in diagram from any point in 150m distance in street only single resting space is required at critical point to complete the whole distance.

This method has been used in solution plans of pointing seating spaces on streets with one side or two sides transversable distance.

#### 4.2.4 Phase 3

- Skill improvement programs and awareness programs should be taken into planning for these hot spots.
- Monetisation of hotspots should be planned through advertisements & shops.
- ESHG (elderly self help group) should be form in which they can decide that which spots and problems are need to be dealt in next phase.
- Agreements and contracts with insurance agencies should be introduced through ESHGs
- Health care programs by government should be introduced to elderly.
- Street cleanliness drives should be arranged by ESHGs in collaboration with RWA and schools in vicinity to make people responsible for their surroundings hence improving it.

#### 4.2.5 Technological Solutions -Smart Pole

##### Panic Button & Siren

Pressing the panic button, software configured by motion detector triggers, or a remote operator can activate the siren



## Camera

Camera capable of 360' simultaneous surveillance through panoramic sensors and integrated fixed Camera.

## Biometric or RFID Identification

Authorized personnel carrying RFID cards can automatically activate all features of the Smart Pole as well as control attached mechanical devices, make phone calls as well as open the first aid hatch with bandages and sugar & salt for emergencies and other services. It can be biometrically attached to adhaar data so that identification and location tracking can be done by emergency responders

### 4.3 Further Study.

In Conclusion, Streets in urban villages are like necessary demons. They might not be the best suited for every activity but they are the spaces that make the primary interaction spaces. For elderly people who have problems walking far distances, street might be the only out they get and if the quality of that street is not good enough to cater to them then we are failing the primary user of street who is totally dependent on it for outside interaction. Streets can't be redone and given another chance, they grow with us and the improvements in street can only be gradual else they lose their character and abolishes the original user.

# Chapter 5

## References





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