

The notion of Ageing in Place and Age-Friendly Housing in Core Urban Area of Lalitpur

Shreejana Maharjan ^a, Ashim Ratna Bajracharya ^b

^{a, b} Department of Architecture, IOE, Pulchowk Campus, Tribhuvan University, Nepal

✉ ^a 076march018.shreejana@pcampus.edu.np

Abstract

This paper aims to study the notion of ageing in place amongst the active elders in the core urban area of Lalitpur and focuses on elders living alone or with spouse. Furthermore, this study also aims to identify the current condition of housing structure that is imperative for an age-friendly city and analyze whether the current city is able to promote independent and active ageing amongst the older population. This study conducted descriptive analysis on data collected through a structured questionnaire and interviews with 112 active elders using snowball-sampling technique. The findings of the study established that the elderly citizens residing in core urban area of Lalitpur had a strong notion of ageing in place, with majority feeling attached to their locality and refraining from migrating to any other area. However, the study revealed that the current housing and building structure of the area do not meet the requirements of age-friendly housing. The factors like easy access to dwelling, ease of walkability, mobility within the house, access to basic needs like toilet and bedroom, and access to sufficient sunlight and natural ventilation in their building were particularly challenged. The study concluded that Lalitpur and other rapidly urbanizing areas should devise a housing guideline to facilitate active ageing.

Keywords

Active Ageing, Age Friendly Housing, Ageing in Place, Built Environment, Core urban area

1. Introduction

All countries around the globe are witnessing a growing concentration of older people. The World Population Prospects 2019 published by United Nations reported that, for the first time in 2018, number of persons aged 65 or above outnumbered children under five years old [1]. United Nations highlighted that older population in Asia will increase from merely 9 percent in 2006 to 24 percent in 2050 [2].

Many studies around the globe have confirmed that older citizens face higher number of challenges in both built environment and social facets of life as ageing compromises their ability to manage everyday life. The decline in physical as well as mental capacity has adverse impact on the ability of the population to live an independent and active life, substantiating the need of age-friendly built environment. With regards to the same, numerous studies as well as organizations around the globe have concentrated their efforts in improving built environment to make it friendlier for

older population.

Built environment can be referred to as man-made spaces, including but not limited to, house, workplace, school, library, hospital, care facilities, streets, transportation, and other outdoor spaces. It can be attributed to a variety of structure from unit, block, and housing to neighborhood and city [3]. Given proper structuring and design of the aforementioned spaces, it can have a significant positive impact on the wellbeing and quality of life of the older aged population [4]. It has been identified that, the built environments that have positive influence on the overall physical and mental health of elders prevents social isolation, signs of depression and loneliness, danger of mortality, falls, and hospitalization amongst the old-aged citizens. The problem of ageing population and the subsequent need of age-friendly built environment is equally relevant in the context of Nepal. Figure 1 shows that in Nepal population under 5yrs children is decreasing while aging population increasing from 2001 A.D. to 2050A.D. Similarly, people belonging to the age group of 60 and above

comprises of 8.1 percent of the overall population of Nepal [5].

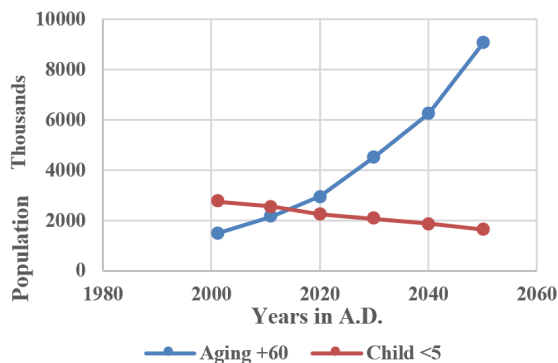


Figure 1: Aging population of Nepal [5]

The Central Bureau of Statistics estimates that the older population in Nepal are likely to reach 3.4 million by 2031[6]. However, studies have identified that healthy ageing in Nepal is challenging as the built environment does not meet the desired requirements essential for the older population [7]. This holds especially true for rapidly growing urban areas like core cities in Kathmandu Valley, where the aging population have instigated a feeling of insecurity, isolation, and lack of confidence. These group are prone to become dependent due to fear of living alone in the rapidly transforming environment from traditional to modern.

The physical and mental strain of ageing citizens in urban areas is attributable to loss of spatial built environment, congested accessibility, and crowdedness[8]. The need of modern high-rise concrete buildings in small plots, congested roads, encroached courtyards, and vehicle parking at public spaces has hindered the likelihood of active and independent ageing amongst older people [9].

This study thus attempts to assess the notion of ageing in place and analyze whether the current housing structure are age-friendly in core urban area of Lalitpur Metropolitan City (LMC).

1.1 Objectives

The major objective of this study are to:

- Examine whether the notion of ageing in place exists amongst the ageing population in core urban area of LMC.
- Analyze whether the current housing and building structure in core urban area of LMC are suitable for independent and active ageing.

1.2 Scope and Limitations

The findings of this study can be extended to core urban areas like LMC or other potential urban geographical regions with comparable characteristics. However, this article does not cover other imperative domain of age-friendly built environment like neighborhood, outdoor spaces, transportation, among others.

The methodology of this study is mostly descriptive in nature which does not provide evidence to cause and effect relation between the factors and active ageing. This study is based on perception of individuals between 60 to 75 years old who are free of any serious health disorders. It does not provide solutions for elders who need constant support, care, and medication.

2. Literature Review

Organizations like WHO have been aggressively working towards building age friendly environment since early 2000s. Some of the initiatives of WHO include "Active Ageing: A policy framework" introduced in 2002 and "Global Age Friendly Cities: A guide" introduced in 2007. The policies are based on the principles of independence, security, participation, health, and other aspects in environment that empowers aging population to live actively and independently. 'Active aging' simply refers to as healthy and successful ageing. Active ageing implies a lifestyle that helps older population live actively without loss of basic abilities, and which leads to mitigation of vulnerability towards old age diseases and disability[10]. For the same, WHO has introduced eight domains that considers a city age-friendly – housing, outdoor spaces and public building, social participation, respect and social inclusion, civic participation and employment, communication and information, community support, and health services [11].

While policies related to built environment of aging population are being implemented worldwide, it is recommended that it is of utmost importance to consider the preference of aging population – whether to age in their respective homes and communities or in elder citizen homes. The major aim of such policies is to ensure active aging through built environment that facilitates in enhancing the ability of ageing population to live independently in their houses and communities. Such environment is deemed necessary

to enhance the quality of life and wellbeing of adults.

2.1 The notion of Ageing in Place

The demographic preferences of ageing population to age in their own homes and communities are widespread throughout the world [12]. Despite deteriorating conditions of mobility, visibility, hearing, and cognitive and mental abilities, older population still desire to continue to live in their own homes and localities. Ageing in place would allow older adults to live in a familiar setting which could enhance their emotional and mental health [13]. Older population who have resided in a place for a longer time build a sense of attachment to the locality which make them refrain from migrating to areas with better services for older population [14]. Living in the locality helps preserve their sense of identity as well as independence [13].

However, while ageing in place allows older adults to retain connections with their community, family, and friends, in cities experiencing rapid urbanization, the rapid changes in the environment can be hostile towards older population and thus it might create barriers for active ageing [15]. Thus, utmost care should be given while designing the city with due consideration to ageing population.

Buildings and outdoor spaces that are designed with age-friendly features can help alleviate the need to shift older population to age care facilities and allow them to age in their respective places [16].

2.2 Age-Friendly Housing and Buildings

Age-friendly housing is the most important domain as it allows older people to age in place without losing autonomy and independence [17]. The rationale behind age friendly housing is to enhance accessibility and mobility of elderly citizens inside the house such that they can live independently and comfortably [18]. Built environment significantly correlates with healthy lifestyle and majority of old aged individuals desired for better houses than those with excellent health condition [19]. The factor behind the preference is the mere fact that older population need higher physical and mental support due to their deteriorating health condition.

Numerous organizations like by WHO and other age-friendly housing guidelines published by Livable Housing Australia, RIBA [20], among others, have introduced a criterion for age friendly housing.

According to WHO, the requirements for age friendly housing and building includes [11]:

- Connectivity to essential services.
- Design that includes sufficient space for free movement, wide passages, and appropriately designed toilets and kitchen, among others.

Likewise, some of the aspects considered as imperative by the Livable Housing Australia are as follows [21]:

- Access to dwelling.
- Easy access to toilet.
- Ease of mobility in staircase to avoid injuries, among others.

Senior Citizens Rules, 2008 of Nepal, particularly designed for age care homes, give higher emphasis on ventilation and sunlight [22].

Some of the common attributes in these houses and buildings that are compatible for Nepal are easy access to dwelling, easy access to essential services, easy access to kitchen and toilet, easy staircase mobility, and ample access to light and ventilation.

Studies have reported that essential services used by elderly citizens in their everyday life like clinics, grocery store, transport stations, and other services should be within proximity to the dwelling [23]. Given ample amount of space between the dwelling and essential services can result in higher dependence and restricted mobility, diminishing the capacity of elderly citizens to live an independent life. Likewise, easy access to dwelling is also essential to ensure that elderly citizens are able to enter into their building without overcoming any obstacles [24]. Vehicular access to dwelling is also an important aspect as elderly population are most prone to emergencies which require immediate medical or other type of attention. Ease of mobility is equally important within the building of residence [25]. For the same, one floor or ground floor layout with all rooms and services within the same floor is desired for older population. Having to access rooms located at different stories of building requires elderly citizens to use staircase frequently. While it might provide some form of exercise to ageing population, elderly citizens with limited physical capacity will find themselves confined to their room as frequent staircase mobility will significantly strain their body [26]. Given the same, higher storied buildings can not only be physically difficult but also will equally affect the mental health of the population. WHO and other

housing guidelines has thus promoted one floor layout and staircase with proper handrails. The studies have also reported that elderly citizens are more prone to staircase accidents. Likewise, access to light and ventilation are imperative during old age. Older populations are recommended to position their bedrooms in location that receives ample sunlight[27]. While at that, it is important to protect elderly citizens from being exposed to air and noise pollution, which can be difficult in core urban areas. These aspects of housing design are considered to have significant effect on the ability of elderly citizens to live comfortably as it enhances accessibility and adaptability of housing and buildings and mobility within the houses.

3. Study Area

Lalitpur, a city experiencing rapid urbanization, is reported to be the oldest city of Kathmandu Valley. The city had two housing patterns: symmetrical linear and courtyard form houses. Average houses were constructed in rectangular plan with about 6m depth, and varying length. Generally, the houses were of three stories, and have sloped roofs built with mud and mortar. The natural lighting, ventilation, and low clear floor height served the ancient lifestyle and the houses did not have bathrooms inside. The elderly population were looked after by their children. It uniquely contributed to both physical and mental wellbeing of the growing population.



Figure 2: Map of Study Area, Lalitpur, Nepal

In the past two decades, Lalitpur city has experienced substantial changes in demography, way of living, and built environment. More importantly, the transformation of the traditional joint family culture to a nuclear family along with the vertical and horizontal subdivision of traditional houses between family members has led to insufficient living spaces for all family members. A general observation suggests that the changes are having adverse impact on the older population as criteria for making age-friendly houses

are often neglected or encroached upon while building new structures.

4. Methodology

This study has employed qualitative research method and descriptive statistics to ascertain the notion of ageing in place and to analyze the current housing and building structures in LMC.

This study is based on primary data collected from 112 respondents through structured questionnaire. The sample, who were above 60 years of age and reside in core urban area of LMC - alone or with spouse, were identified through snowball sampling. Snowball sampling is a non-probability sampling method which is used to identify samples which have traits and are not commonly found. In such type of sampling, the initial samples, identified purposively, provide referral to identify additional samples relevant for the study[28].

5. Analysis

5.1 The notion of Ageing in Place

The notion of ageing in place is a broad concept that encompasses the personal attachment of an individual towards a place that allows people belonging to old age groups attain a sense of identity and independence. Under this notion, older individuals desire to continue living in their homes and neighborhood despite their deteriorating physical health, mental health, mobility, and access to services.

5.1.1 Length of Residency:

Figure 3 depicts that majority respondents, that represented 51 percent of total respondents, have been living in the locality for more than 10 years. Likewise, a significant number of respondents (38 percent) have been living in the locality since their birth. Only 2 percent of respondents had been living there for less than 5 years.

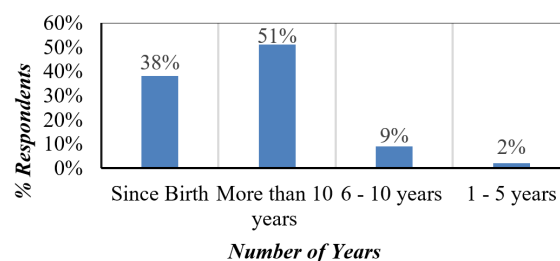


Figure 3: Length of Residency

5.1.2 Attachment & Satisfaction towards the place:

65 percent respondents feel very attached to the neighborhood. The study did not identify any respondent who did not feel attached to the locality that they were living in. Similarly, 98 percent of respondents agree that they are satisfied with the current location of their building, and their neighborhood.

5.1.3 Plans of Migrating:

Majority (82 percent) of respondents did not plan to move from the location or migrate elsewhere. Figure 4 revealed that friendly neighborhood (54 percent) and having spent their lifetime (35 percent) in the locality were the major factor behind the denial to migrate.

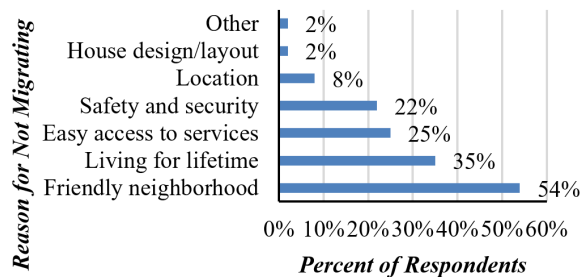


Figure 4: Reasons for Not Migrating

This justifies the desire of old age groups in core urban area of Lalitpur to continue living in the locality due to personal belongingness to the place.

5.2 Age-Friendly Housing and Building

Age-friendly housing and building are designed to enable older aged people to live independently despite compromised physical and mental health. Thus, caution should be paid towards the housing and building to ensure that old age people have easy access, easy mobility, and sufficient natural daylight and ventilation.

5.2.1 Access to Dwelling & Walkability:

Amongst the total respondents, 37 percent access their dwelling from courtyard, 34 percent from residential street, 17 percent from non-vehicle alley, and 12 percent from main road as shown in figure 5.

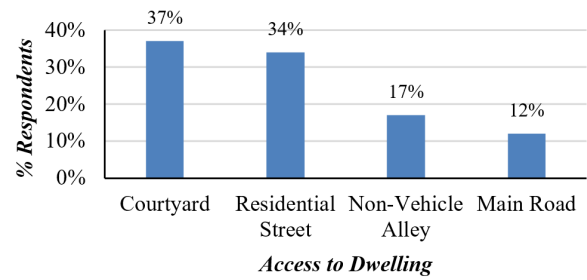


Figure 5: Access to Dwelling

36 percent respondents reported that they feel only a little comfort or safety while walking in the street, road, or alley in their locality. 3 percent reported that they do not feel safe and comfortable at all. The number of respondents who face difficulty in walking in the neighborhood reported vehicle movement, vehicle parking (figure 6), and congestion to be the major hindrance.



Figure 6: Vehicle Parking in Courtyard

If difficulty in walking persists due to problems in the surrounding, older citizens often find themselves dependent or in isolation at home which affects both their physical and mental health.

5.2.2 Connectivity to Essential Services:

Figure 7 depicts that 48 percent respondents in core urban area of Lalitpur can access essential services right beside their home. However, 47 percent reported that such services are situated 100 to 500 meters away from their home. This implies that they must walk for about 5 minutes to 15 minutes to access the services.

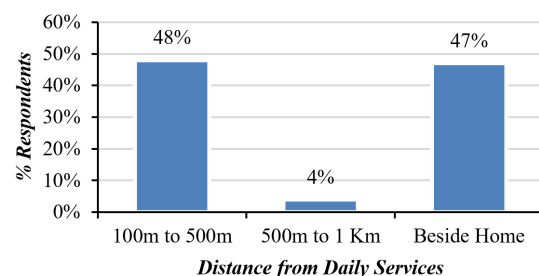


Figure 7: Connectivity to Essential Services

Likewise, 4 percent respondents revealed that such services are situated at 500 meters to 1 kilometer away from their home. The longer distance in acquiring basic services limits the independence of older individuals.

5.2.3 Number of Stories & Staircase Mobility:

Figure 8 suggests that majority respondents live in buildings with more than 3 stories. 63 percent respondents have three to four stories in their house and 32 percent respondents have more than 5 stories. Older aged individuals often face difficulty in conducting their daily activities if the number of stories in the building is high. This makes them dependent on others, as older individuals have limited physical capabilities.

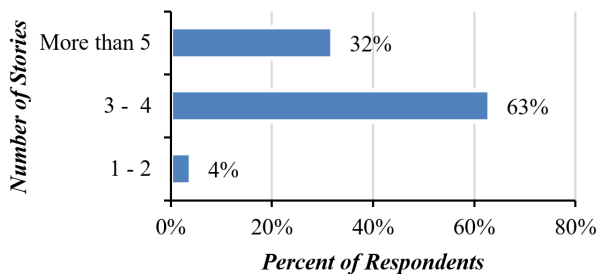


Figure 8: Number of Stories

Further, survey reveals that 43 percent of the respondents are not satisfied with the staircase in the building. A general notion behind the dissatisfaction is attributed to frequently climb up and down the staircase to conduct different activities.

The survey revealed that higher number of stories (figure 9, Right) and having to climb the staircase made them tired. They also responded that they did not have handrail in the staircase, which made their mobility much difficult.



Figure 9: Traditional (Left) & Modern (Right) Stories

5.2.4 Access to Bedroom & Toilet:

Figure 10 depicts that majority of respondents (53 percent) have bedroom on the third floor of their building. Likewise, 30 percent responded that their bedroom is situated on the second floor. 6 percent of respondents said that their bedroom is situated higher than third floor. Bedrooms at higher levels are not suitable for older individuals as it requires them to use staircase frequently.

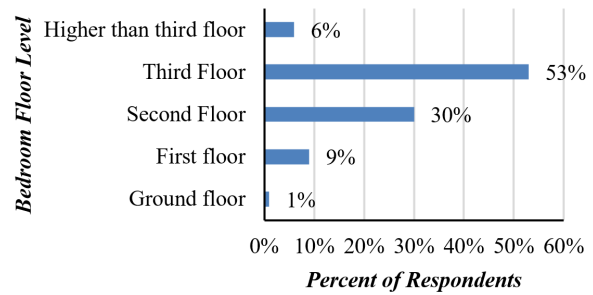


Figure 10: Access to Bedroom

Similarly, majority respondents said that they are satisfied with the location of toilet in the building. The survey revealed that respondent who are not satisfied with the location of toilet (15 percent) prefer bedroom & toilet on the same floor as it enhances both their mobility and access to utilities within the house.

5.2.5 Access to Natural Light and Ventilation:

Access to natural sunlight and ventilation is regarded as important for the health of old aged individuals. There should be minimum 2-hour direct sunlight in a room but 75 percent respondents do not have natural sunlight in their building due to blockage from the neighbor building and small opening sizes which can have an adverse impact on the health of older citizens. However, 75 percent respondents are satisfied with the natural ventilation in their building.

6. Discussion and Finding

One of the widely discussed phenomenon that is imperative for designing age-friendly cities is the notion of ageing in place [11], [12]. It establishes the need to design age-friendly built environment in respective localities of older adults as such individuals refrain from migrating to other cities or old-age homes due to personal belongingness and attachment to the areas or localities that they have been residing in.

The findings of this study revealed that actively ageing population prefer aging in place and did not want to move from the locality despite significant compromises their physical abilities to cope with the place. This sense of personal belongingness and attachment to the locality establishes a sense of notion of ageing in place [14].

This also confirms the need to build or modify the core urban area of Lalitpur, such that, it would be more old age-friendly to enable elderly citizen to not only live independently but also to maintain their mental and physical health imperative for quality of life and wellbeing. However, the findings shows that the core urban area of Lalitpur does not meet majority of criteria imperative of an age-friendly housing.

As recommended by World Health Organization and other age-friendly housing guidelines published by Livable Housing Australia, RIBA, among others, housing and buildings in age-friendly cities should be designed with much caution as it has significant bearing on the quality of life of old-aged groups. Such designs should not just ensure safety and comfort but also should be able to provide easy access to services both within and outside the house. It should be designed with utmost care regarding the deteriorating physical capacity of the active elders. Complex structures of housing and building can result in social isolation of the active elders due to restrictions in their mobility and access, which results in increased feeling of loneliness and depression.

The findings of this study suggest that the internal structure of the dwellings in LMC were less responsive to the requirements of age-friendly housing and buildings structure thus does not support independent and active ageing.

Traditionally, the classical and social set-up of the city was such that nuclear families were discouraged and people often lived in joint families. The previous physical and social structure of Lalitpur in some ways facilitated active aging given the fact that the elderly populations were looked after by their children and the neighborhood spaces consisted of ample buildings and structures for the elderly people to participate. It uniquely contributed to both the physical and mental well-being of the growing population.

In the past two decades, Lalitpur city has experienced substantial changes in demography, way of living, and built environment. With a decline in birth rate and rapid out-migration of youth, the old people often live

alone in their houses. Given the previous societal structure, these people refrain from migrating to old-age homes or areas other than their native land. Additionally, the 25 April 2015 earthquake not only claimed hundreds of lives in the Valley but also partly or fully demolished many residential buildings displacing family members. This also led to abandoned old family homes by youths, forcing elderly people to stay behind alone in less secure buildings.

Traditional societal structure, dwelling access, living spaces (figure 11,12; Left), sunlight, ventilation, and circulation pattern had their own advantages regarding access to essential services, and physical and social wellbeing. However, penetration of the concept of a nuclear family in the area has resulted in vertical subdivision of the buildings, making people reluctant to build slender tall buildings in the limited land, as shown in figure 11 (right).

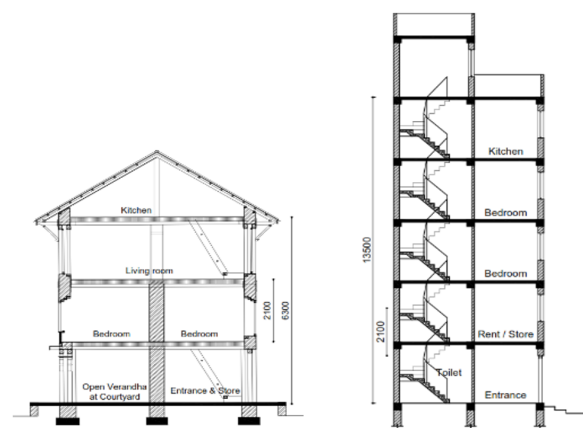


Figure 11: Typical Traditional (Left) & Modern (Right) Sections

The city has thus experienced numerous changes and a general observation suggests that the changes have an adverse impact on the older population as criteria for making the city age-friendly are often neglected or encroached upon while building new structures.

In the core urban area of Lalitpur, the responses regarding dwelling zones, dwelling type, and safety regarding building materials were positive. However, it was identified that more than 50 percent of houses were in row form of dwelling, more than 50 percent of the dwelling were situated at least 100 meters to 1 kilometer away from daily services and activities, and about 30 percent of individuals lived either in the non-vehicle alley or enclosed courtyard.

Table 1 shows that the non-vehicular access to the buildings obstructs movement during emergencies and

Table 1: Comparison between the Criteria for Age-Friendly Housing & Building and its Existing Status

S.N.	Factors	Literature	Existing	Inferences
1	<i>Access to dwelling and Walkability</i>	<ul style="list-style-type: none"> ▪ Easy access to the dwelling 	<ul style="list-style-type: none"> ▪ Non-vehicular road access to dwelling restrict emergency access to the ambulance. ▪ Vehicular access dwelling leads to chaotic, noisy, pollution, and unsafe 	<ul style="list-style-type: none"> ▪ Restricting vehicular movement ▪ Concept of one way ▪ Vehicular movement Timing: Morning: 9 - 11am & Evening: 5 to 7pm
		<ul style="list-style-type: none"> ▪ Pedestrian friendly walkways with free of obstruction 	<ul style="list-style-type: none"> ▪ Difficult to walk due to high congestion ▪ Vehicular movement ▪ Obstruction from parked vehicles 	<ul style="list-style-type: none"> ▪ Pedestrian friendly walkways ▪ Planned vehicular movement ▪ Removal of chaotic vehicular parking
2	<i>Essential services like Daily groceries</i>	<ul style="list-style-type: none"> ▪ Close proximity with easy access 	<ul style="list-style-type: none"> ▪ The essential services like groceries lies right beside the dwelling ▪ Within 5 to 15 min. walking distance 	<ul style="list-style-type: none"> ▪ Best reason to live in the core urban area
3	<i>Number of stories & Staircase mobility</i>	<ul style="list-style-type: none"> ▪ More than two stories not recommended ▪ Staircase with handrails 	<ul style="list-style-type: none"> ▪ Dwelling more than 3 stories ▪ Congested staircase well with high riser ▪ Lack of proper handrails 	<ul style="list-style-type: none"> ▪ Elders circulation up to 2 stories ▪ Planned with easy access staircase ▪ Provide appropriate handrails ▪ Modification subsidiary from government
4	<i>Access to Bedroom and Toilet</i>	<ul style="list-style-type: none"> ▪ Easy access ▪ On same floor 	<ul style="list-style-type: none"> ▪ Limited rooms per floor (only one room per floor) leads to difficult access ▪ Toilets & Bedroom are not in same floor 	<ul style="list-style-type: none"> ▪ Planned floor area design ▪ At least small toilet on bedroom floor
5	<i>Access to natural Light and Ventilation</i>	<ul style="list-style-type: none"> ▪ Minimum 2 hour Sunlight in room ▪ Fresh Air 	<ul style="list-style-type: none"> ▪ No Sun light due to small window sizes ▪ Obstruct from adjoining tall buildings ▪ Satisfied ventilation 	<ul style="list-style-type: none"> ▪ Planned rooms design with sufficient sunlight ▪ Policy for tall building ▪ Designed natural cross ventilation

physical difficulties, however, it still provides privacy and security to the elders. Vehicular access to the building gives easy access during an emergency but is chaotic, noisy, polluted, and unsafe for the elders. Moreover, the study also identified that almost 40 percent of the elderly citizens found it difficult to walk in the neighborhood due to high congestion, parked vehicles, and vehicular movement. For elderly citizens with extensively compromised physical strength, accessing the dwelling can be a challenge, thus resulting in detachment with neighborhood or outdoor spaces and isolation. Likewise, having to travel a great distance to access services within the locality can result in higher dependence and restricts the mobility of elderly citizens [29]. Currently, it has been reported that elderly citizens need to travel at least 5 to 15 minutes to access essential services and activities, which is a best reason to live in core urban area.

Another major problem associated with dwellings in non-vehicular narrow alleys is that it acts as a barrier to access to natural light and ventilation. Given the

rise in haphazard building structures throughout the city, it is difficult for dwelling in core areas of Lalitpur to access natural light and ventilation. This holds even in the case of the courtyard. The tall building in close proximity and lack of ample space in housing has translated to compromise on access to sunlight and ventilation in the buildings as the majority of houses can access sun only through their rooftop or in some front-facing windows.

The current building structures in LMC have only one room with small staircase area per story left after the subdivision as shown in figure 12 (right). 63 percent of respondents have three to four stories in their house and 32 percent respondents have more than 5 stories. The elder citizens thus need to frequently use the staircase for accessing rooms and services within the house. Physical constraints and lack of proper handrails in the staircase have further exacerbated the issue. Moreover, the risk of accidents in the staircase is higher amongst older adults [30]. Buildings with more than two-story are not recommended for old-aged individuals as such individuals are often

constrained by their physical strength to frequently move inside their house [31]. It diminishes their ability to access services within their house.

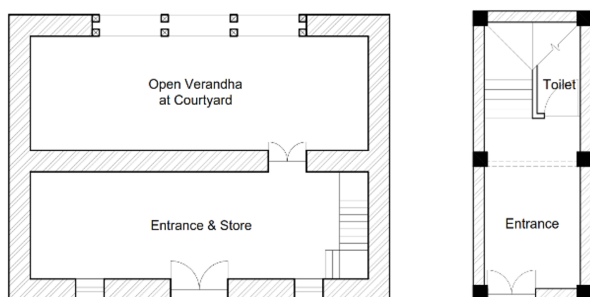


Figure 12: Typical Traditional (Left) & Modern (Right) Ground Floor Plan

Moreover, the elderly population refrain from going out of the house for social purposes because of the difficulty in having to climb up higher story buildings and rooms to return to their houses [32]. This not only affects the community participation of older citizens but also creates barriers to socializing within their house amongst family members.

The majority of respondents suggested that it would be easier for them if all the rooms were on the same floor, including the kitchen, bedroom, and toilet. However, such is not the case in Lalitpur. The elderly citizen often finds themselves dependent on others given constrained mobility within the house. Thus, such a structure adds a burden on both the mental and physical health of older citizens, diminishing their quality of life.

7. Conclusion

The findings of the study revealed that the elderly population in LMC have a strong notion of ageing in place. Majority individuals feel highly attached to their locality and do not intend to migrate. Thus, it is imperative for the city to have age-friendly built environment to facilitate active ageing of such elders.

Age-friendly housing and building is one of the imperative criteria of age-friendly built environment. Based on criteria introduced by different organization, it was identified that the housing and building structure in LMC are less response to active ageing. Some of the problems in LMC are difficulty in access and walkability, difficulty in mobility within the house and lack of access to sunlight. The results provide new insight into the changing housing structure's needs as per the changing social-cultural value.

This implies that the current housing structure prevents elderly individual to live actively and independently. Additionally, it also contributes to elders refraining from mobility both within and outside the house which leads to isolation, loneliness, and depression.

8. Recommendations

The findings of this study suggests that the architects and planners have a major role in ensuring that housing structures are age-friendly. Given the same, imperative aspects of age friendly housing like one floor layout; essential rooms bedroom and toilet on same floor, handrails in staircase, safe flooring plans, location of bedroom, access to sufficient sunlight and cross ventilation, access to building, and ease of mobility within the house should be considered by the architects.

Likewise, the government should develop a policy or housing guideline that promoted factors of age-friendly housing; residential zones, connectivity to essential services, planned vehicular movement & parking, pedestrian friendly walkways, policy for tall building, etc. Furthermore, subsidy for older population is recommended for the modification of the building.

9. Further Study

The study shows elders prefer 'ageing in place'. However, the research only covers housing and building structure thus the study is incomplete without the study of the neighborhood that envelopes the dwelling. Therefore, further study of the surrounding is highly recommended so that elders can age in place independently and actively.

The study conducted on elders living alone or with spouse only does not cover the elders who live with their adult children. In order to devise a policy, the needs of such group of older citizens should also be studied. Detailed investigation of this larger group of senior citizens can contribute to more comprehensive design of age-friendly housing & buildings.

Acknowledgments

The authors express their sincere gratitude to 'Ageing Nepal' for providing grant-based support to this study. The authors are also thankful to all the elders of core

urban area of LMC for giving their valuable time to answer the research questions.

References

- [1] UN (United Nations). World population prospects 2019: Highlights, 2019.
- [2] Social Affairs. Population Division. *World population ageing 2007*, volume 260. United Nations Publications, 2007.
- [3] S Karuppannan and A Sivam. Healthy ageing and neighbourhood design: a case study in south australia. *International of Aging Society*, 2(1):39–52, 2013.
- [4] Hing-Wah Chau and Elmira Jamei. Age-friendly built environment. *Encyclopedia*, 1(3):781–791, 2021.
- [5] Ageing Nepal. *Annual Report Monthly Discussion Forum on Ageing*, 2018.
- [6] CBS. *Population Monograph of Nepal (Social Demography)*, 2014.
- [7] Christiane Brosius. Caring in/for place: Old age in urban nepal. *CARING FOR OLD AGE*, page 119, 2020.
- [8] Geriatric Center Nepal. Status report on elderly people (60+) in nepal on health, nutrition and social status focusing on research needs, 2010.
- [9] Geriatric Center Nepal. Status report on elderly people (60+) in nepal on health, nutrition and social status focusing on research needs. *Kathmandu: Government of Nepal, Ministry of Health and Population*, 2010.
- [10] Mary Luszcz, Lynne Giles, Simon Eckermann, Penny Edwards, Kathryn Browne-Yung, Cathy Hayles, and Kelly Trezise. The australian longitudinal study of ageing: 15 years of ageing in south australia. 2007.
- [11] World Health Organization. *Global age-friendly cities: A guide*. World Health Organization, 2007.
- [12] Janine L Wiles, Annette Leibling, Nancy Guberman, Jeanne Reeve, and Ruth ES Allen. The meaning of “aging in place” to older people. *The gerontologist*, 52(3):357–366, 2012.
- [13] Damien Stones and Judith Gullifer. ‘at home it’s just so much easier to be yourself’: older adults’ perceptions of ageing in place. *Ageing & Society*, 36(3):449–481, 2016.
- [14] Katinka E Pani-Harreman, Gerrie JJW Bours, Inés Zander, Gertrudis IJM Kempen, and Joop MA van Duren. Definitions, key themes and aspects of ‘ageing in place’: a scoping review. *Ageing & Society*, 41(9):2026–2059, 2021.
- [15] Camilla Lewis and Tine Buffel. Aging in place and the places of aging: A longitudinal study. *Journal of aging studies*, 54:100870, 2020.
- [16] Karen Grimmer, Debra Kay, Jan Foot, and Khushnum Pastakia. Consumer views about aging-in-place. *Clinical Interventions in Aging*, 10:1803, 2015.
- [17] Adriana Luciano, Federica Pascale, Francesco Polverino, and Alison Pooley. Measuring age-friendly housing: A framework. *Sustainability*, 12(3):848, 2020.
- [18] Sarah Sinclair, Ashton de Silva, and Foula Kopanidis. Exploring the economic value embedded in housing built to universal design principles, 2020.
- [19] Kathy Black and Dylan J Jester. Examining older adults’ perspectives on the built environment and correlates of healthy aging in an american age-friendly community. *International journal of environmental research and public health*, 17(19):7056, 2020.
- [20] RIBA Architecture. *RIBA Sustainable Outcomes Guide 2019*, 2019.
- [21] Livable Housing Australia. *Livable Housing Design Guidelines (4)*, 2017.
- [22] Nepal Law Commission. *Senior Citizens Rule 2008*, 2008.
- [23] Pradeep Acharya. Senior citizens and the elderly homes: A survey from kathmandu. *Dhauagiri Journal of Sociology and Anthropology*, 2:211–226, 2008.
- [24] Sourav Goswami and Pradeep R Deshmukh. How “elderly staying alone” cope up with their age and deteriorating health: A qualitative exploration from rural wardha, central india. *Indian Journal of Palliative Care*, 24(4):465, 2018.
- [25] William A Satariano, Jack M Guralnik, Richard J Jackson, Richard A Marottoli, Elizabeth A Phelan, and Thomas R Prohaska. Mobility and aging: new directions for public health action. *American journal of public health*, 102(8):1508–1515, 2012.
- [26] R Unesha Fareq and T Neeraja. Designing staircase for age-friendly housing.
- [27] Xiaojie Lu, Nam-Kyu Park, and Sherry Ahrentzen. Lighting effects on older adults’ visual and nonvisual performance: A systematic review. *Journal of Housing for the Elderly*, 33(3):298–324, 2019.
- [28] Charlie Parker, Sam Scott, and Alistair Geddes. Snowball sampling. *SAGE research methods foundations*, 2019.
- [29] Bingqiu Yan, Xiaolu Gao, and Michael Lyon. Modeling satisfaction amongst the elderly in different chinese urban neighborhoods. *Social Science & Medicine*, 118:127–134, 2014.
- [30] Jesse V Jacobs. A review of stairway falls and stair negotiation: Lessons learned and future needs to reduce injury. *Gait & posture*, 49:159–167, 2016.
- [31] Kimiko Tomioka, Norio Kurumatani, and Hiroshi Hosoi. Association between stairs in the home and instrumental activities of daily living among community-dwelling older adults. *BMC geriatrics*, 18(1):1–10, 2018.
- [32] Gokarna Raj Aryal. The status of elderly people in nepal. *Patan Pragya*, 5(1):11–18, 2019.