

APPRAISING A SENSE OF COMMUNITY IN DESIGNING SENIOR HOUSING FOR ELDERLY QUALITY OF LIFE

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ABSTRACT

Malaysia's life expectancy may increase by 2030, where the ageing population aged above 65 years and over is growing faster than all other age groups. It is expected that this ageing population will be more than 15% of the total population in the year 2030, and this percentage is likely to rise higher over the next three decades. The increasing longevity indicates the climbing numbers of surviving older people, who demand better living and Quality of Life (QoL) later in life and retirement concerning housing, transportation, social participation and health services. However, the most critical issue is the elderly living housing, namely in developed countries where many still lack proper physical environment to accommodate and improve community development among the elderly. Consequently, the rights for appropriate, adequate, decent, and good quality housing for ageing people in either quantitative or qualitative approaches are not well acknowledged. This paper highlights community importance as the elderly require a solid community to promote active ageing and life satisfaction, which is vital to be implemented in their living environments like the elderly housing design planning layout and form making. To achieve this, the first objective of this paper is to identify the Sense of community index among the elderly and second to propose the best elderly housing design concept in terms of spatial planning and form making, which considers the Sense of community indexes that supports independent living to enhance the Quality of Life (QoL) for the ageing population. This study used the mixed method approach to collect data from case studies through literature review and direct observations. The Sense of community index comprising membership, influence, fulfilment, and shared emotional connections are analyzed to see its correlation and representation in the current case study of senior housing spatial design in Malaysia. The findings indicate that for senior housing to have a sense of community, architectural qualities like identifiable forms and spatial values with connected, shared spaces either at horizontal or vertical levels and vast shared public spaces are essential. This study helps establish the best living concept for elderly housing as a reference for developers, policymakers, and designers to produce proper senior housing to enhance Quality of Life (QoL).

Keywords: Sense of Community, Elderly housing design, Spatial organisation, form-making

INTRODUCTION

Malaysia populace is estimated at 40 million, making it the 42nd most populated country in the world. The demographics data indicates that Malaysia will reach an ageing nation between the years 2020 and 2040. In brief, the age structure populace of more than 65 years old and over may double from 7% to 15% of the total population. This situation placed Malaysia as one of the fastest ageing nations after Singapore, Columbia and India (Magnus, 2012). According to the latest National Census by The Department of Statistics Malaysia (Portal, 2020), the elderly population consists of 9.96% of the 32.4 million people in Malaysia. From 9.69%, there are 1.58 million older men and 1.65 million older women across the country. The highest elderlies' distribution in Malaysia is in Selangor with 305 thousand elderlies, followed by Johor with 249 thousand and Perak with 247 thousand elderlies (Portal, 2020). Scholars highlighted that these elderlies are located in two different geographical settings in urban and rural settings (Aini, Murni, & Abd Aziz, 2016). However, the percentage of elderly residing in metropolitan areas is much higher and increasing due to the fast development of rural areas that have transformed them into urban. This speedy growth in the ageing population has caused demographic, epidemiological, and socio-cultural changes, especially in the living arrangement that are supportive and livable for all in later life age for the elderly. Past scholars highlighted that

Malaysia's elderly living place still lacks awareness regarding the concept of universal design and its implementation (Tobi, Fathi, & Amaratunga, 2017). For that matter, elderly housing is not well designed according to the social and psychological needs of the elderly. This involves the physical housing environment comprising architectural spaces for communal integration, the suitability of housing location and proximity within the available public facilities, planning attributes connected to mobility, safety, privacy, and comfort accessibility for the elderly (Nooraisyilah, 2017). As an outcome, many elderly housing schemes in Malaysia remain superficial without correctly translating elderly needs into practically feasible architectural solutions (H. Ismail, Halil, Abidin, & Hasim, 2020). The demand for elderly housing is likely to be growing in the coming decades, but a novel approach to designing best living concepts for the elderly is still left undiscussed (Ismail & Zamry, 2020).

This study aims to elaborate on the critical elements needed mainly by the elderly, the sense of community in designing their living spaces. This study on community sense may be adopted in all types of elderly housing, ranging from independent living homes and assisted living centres. This is because 'Sense of community is vital as it plays an intervening role between ageing group quality of life domains and the overall Sense of community satisfaction among the elderly. This is followed by translating the community's values in form and space making of elderly housing design to produce the best living design concept. For the study's benefit and to fulfil the two objectives above, the following section's literature review will discuss community sense characteristics. This is because identifying the indicator that measures the concept of community will address the quality of life (QoL) for the elderly. In other words, this will set out community indexes related positively to QoL and help mitigate stressors affecting the elderly.

LITERATURE REVIEW

Defining a sense of community for the elderly

The term "sense" consolidates collectiveness or 'we-ness among society members (Francis, Giles-Corti, Wood, & Knuiman, 2012). By acknowledging it with the notion of community, "sense" provides meaning or feeling that one gets regarding a place, such as a neighbourhood or community or collective group. Many previous scholars like McMillan and Chavis (1986) had established a sense of community index (SCI), emphasising elements such as the reinforcement of needs, membership, influence, and shared emotional connection in the late '80s. However, these elements were reviewed due to their appropriateness and demand in the current context, further developing the revision. This revised Sense of community index (SCI2) portrayed advanced opinions that focused on socio-demographic, social interaction, and physical environment characteristics (Chavis, Lee, and Acosta (2008). In other words, stresses on societal participation in a community highlight casual social encounters as essential factors to increase communal satisfaction (Chavis et al., 2008). It is crucial to encourage a sense of feeling that members belong to a group with shared faith and commitment for achieving this. This psychological construct takes a period to be built through association and cooperation. A strong sense of community has a tremendous positive impact in improving well-being, securing safe feelings, generating high community participation and civic responsibility.

According to scholars, "community" is defined in two phases. First is the territorial and geographical level (community of place). Secondly, it is a community of interest that comprises two categories (Heywood, 2016; Mannarini & Fedi, 2009). The first category is the identity based on a relational level involving the quality of human relationships, without the location (Heywood, 2016; Mannarini & Fedi, 2009). Second is the organisationally formal groups like network-based guilds or incorporated associations (Heywood, 2016; Mannarini & Fedi, 2009). However, relational communities' aspects and correlated factors such as social bonding, neighbourhood

attachment and behavioural rootedness will focus on the study's benefit. Sense of community is vitally needed for the elderly, as social relationships and connectedness may develop elder-friendly communities and help retain their cognitive to function better. Nevertheless, the advantages go far beyond physical health. For the elderly, fostering a sense of community is a social process that includes social interaction and cultural assimilation. Regularly socializing with others provides far more benefits, creating a better quality of life and even longer life.

Characteristics and elements relating to the Sense of community for elderly

Many past scholars agreed that community sense relates to life satisfaction, a vital part of subjective well-being, leading to finding meaningful lives, entire or of generally high-quality life (Jolanki & Vilkkö, 2015). Many internal and external factors contribute to one's subjective well-being and life satisfaction. The previous study posits that there are four critical aspects to promote a sense of community. These are membership (feeling of belonging), ability to express freedom (having influence), integration and fulfilment of needs (togetherness), and shared emotional connection (Chavis & Wandersman, 2002). This is explained in turn below.

Membership is known to indicate a feeling that one has devoted a part of oneself to belong to a particular group with boundaries. This is essential to provide its members with emotional safety to fulfil group needs and feelings (Maher, 2005). Having membership affiliation will promote a sense of belonging among oneself to a specific group. This is important as having a sense of belonging is a fundamental human motivation towards conforming to others approval, build rewarding relationships, and enhance individual self-esteem. Allowing the individual elderly to become part of the group is positive reinforcement as a motivation source for the elderly to be valued and valuable to others. In return, socialization in a group may improve memory and longevity as it reduces stress and isolation, including increasing the elderly lifespan. The ability to express freedom and influence is vital among the elderly, as, from past studies, many elderly agreed that they prefer to have the rights and autonomy in making their own decisions and go about their daily lives according to their values and preferences (Merry & Simon, 2012). Making choices among the elderly is empowering, where many elderly seek to control and influence their destiny. Once this is established, influential elderly may influence what a group does, and they can be more easily engaged in a community that makes them feel influential. Having a sense of community, integration, and fulfilment of needs (togetherness) is also a critical factor in putting the elderly in a better mutual bond with shared interdisciplinary strength for a productive senior society (Procentese, De Carlo, & Gatti, 2019). This later produces a healthy elderly society to fulfil others' needs while fulfilling their own needs. It is apparent to sustain a healthy sense of solidarity for the satisfaction of needs. In promoting a sense of community, mutual emotional connection gives the elderly meaningful ways to connect, share, respect others, opportunities to participate in the community, and chances to feel a spiritual connection between senior members (Mannarini & Fedi, 2009). The outcome is a drive among the elderly to give to others in a meaningful way that encourages generativity (the concern for establishing and guiding the next generation). This is important to ensure better mental health and lighten the elderly mood and make them feel happier to promote a sense of safety, belonging, and security towards a better quality of life (QoL). To understanding the QoL domains as defined for the elderly needs, the next section will elaborate on this in detail.

Relationship of community sense elements for Quality of Life (QoL) among elderly

Quality of life (QoL) among the elderly encompasses many domains that should be viewed from multidimensional aspects (Gong & Kim, 2010). According to scholars, in measuring the QoL among the elderly, elements like a satisfying life, subjective and psychological welfare, personal development and health status such as physical health, psychological state, level of independence

of the person, personal relationships, beliefs in a particular context or the natural environment, social support, and perceived social support are essential to take note (Patricia, 2000). In other words, when considering the best QoL, one must consider the elderly life experience, how they feel, and how they interpret their lives. For this matter, the past work by Fernández-Ballesteros, Kruse, Zamarrón, and Caprara (2007), are referred based on the data obtained from their validated questionnaire CUBRECAVI (“Cuestionario breve de Calidad de Vida”) (Short QoL questionnaire). This is a reliable and valid scale for the multidimensional measurement of health and quality of life in old adults when assessing the elderly population in various South American countries. Their work was referred to as having established well-justified determinants to provide a multidimensional evaluation of the QoL in old adults. These variables help to produce QoL for the elderly involving evaluation comprising of better health, social integration, leisure and activities, functional capacities, and environmental quality. Referring to the studies by Fernández-Ballesteros et al. (2007), four of the variables related to QoL elderly can be utilised as determinants for this study in the context of Malaysia (refer to Table 1). Overall, there are significant associations between QoL variables described in the scale CUBRECAVI by Fernández-Ballesteros and Zamarrón (2007) for the elderly related to community sense (refer to Figure 1.0). Therefore, these determinants will be used to assess the existing case study of elderly homes in the global context and see its correlation with the elderly house form making and spatial organisation, whether the current elderly housing design portrays community sense elements to promote the elderly QoL or not. However, the most prominent aspect is the elderly quality of life is from the environmental quality, which involves the built environment like the elderly-built form and living spaces including related facilities to carry out their basic daily living. This is important to support the Sense of membership or feeling of belonging to the place and the existing community. From this, the best living design conceptual framework for elderly housing can be produced as a reference for relevant authorities in the future. The following section explains how appropriate spatial design and form making may portray belonging or membership among the elderly to promote environmental quality.

Table 1 Correlation between elements of Sense of community and the QoL variables and its representation from the architectural aspects

| Elements of Sense of community according to past scholars | CUBRECAVI QoL variables (“Cuestionario breve de calidad de vida”) (Short QoL questionnaire) (Fernández-Ballesteros et al., 2007) | Built environment characteristics related to the Sense of community |
|--|---|---|
| Membership (feeling of belonging) (Chavis & Wandersman, 2002; Francis et al., 2012) | Environmental quality | Form making and spatial organisation (French et al., 2014; Mohammad & Abbas, 2012) |
| Ability to express freedom (having influence) (Alexandre, Cordeiro, & Ramos, 2009; A. S. Ismail & Zamry, 2020) | Functional capacities | Program and activities conducted within live space (Hannon III, Sawyer, & Allman, 2012) |
| Integration and fulfilment of needs (togetherness) (Gonyea, Curley, Melekis, & Lee, 2018) | Leisure and activities | |
| Shared emotional connection (Cantarero, Potter, & Leach, 2007; Yu, Wong, & Woo, 2019; Zaff & Devlin, 1998) | Health and social integration | |

Architectural design elements to portray the Sense of community (feeling of belonging) for better environmental quality

According to scholars like Francis et al. (2012), the built environment is primarily a tool that provides a physical setting that may somehow shape and influence one's values, norms, and lifestyle. The built environment relates to the person's cognitive and behavioural responses to a particular context. For that matter, people may use cues incorporated in the built environment's physical appearance to make inferences about their positioning in a community, affiliation or association, and the interaction between them, including maintaining social order (Jung, Lee, & Kim, 2015). Like spatial organisation and form-making in the built environment, these physical cues and characteristics may be referred to as symbolic barriers for defining boundaries, as territorial markers, indicating ownerships, reinforcing identification, feelings of attachment, and acting as a societal functioning mechanism for building the Sense of community (Beqaj, Rizvanolli, & Hasimja, 2015). In this Sense, through the capacity of the built environment physical characteristics, it may communicate to the user conceptually from different levels of meanings comprising the low-level, primarily middle level and possibly high level that emphasizes human cultures importance. Moustafa (2009) highlighted the low-level meaning refers to the daily instrumental meaning expressed through users' intended action to fulfil their actual shared needs and interest whilst the middle and high-level meaning much involves user's association with social and economic status, education level, and sociability interpreting the built environment for fulfilling perceived shared needs and interest. However, these actual shared needs comprised of a specific set of shared interests and needs to develop the local community characteristics is interrelated with the perceived shared needs and interest (Moustafa, 2009). This is because once the specific set of shared interests is formed, it will establish commonalities or agreement in same interest and needs that in return promote the feeling of shared emotional connection, which propagate the psychological components of the society like the Sense of community (membership and belonging) (refer to Figure 1). Since the Sense of community is the study's focus, these physical cues involving the spatial organisation and form-making in the built environment will be elaborated in turn.

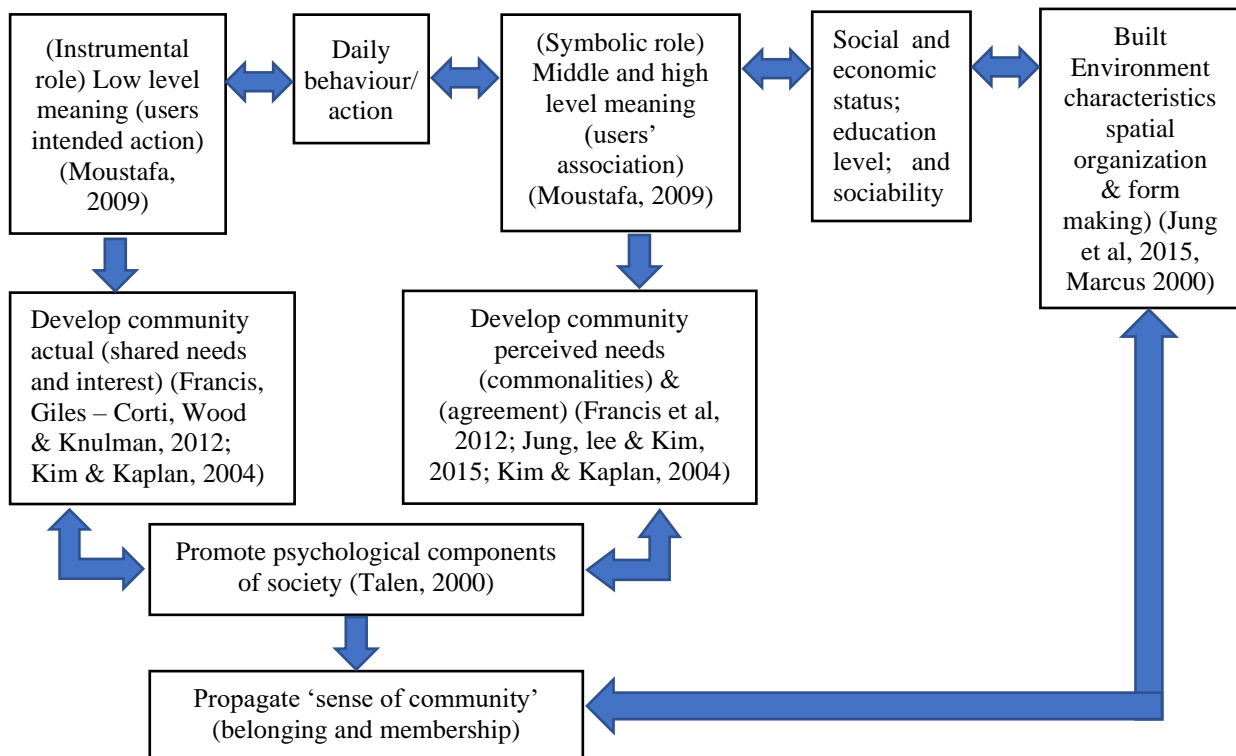


Fig. 1 Framework of 'sense of community' and its influence on the built environment

Spatial organisation (lived space) and form making for a sense of community among elderly

Social theorists such as Lefebvre focused on studying space production and viewed space as social totalities production (Wilson, 2013). According to Lefebvre, space is a social product that contains the social relations of reproduction relating to specific society organisation and defines spatial organisation in hierarchical social functions (Zhongyuan Zhang, 2006). Three types of practice produce this social space (Lefebvre & Nicholson-Smith, 1991). The first is a spatial practice that embraces the production and reproduction of society. The second is the representation of space tied to the relations of production and the 'order' in society, and the third is representational spaces that embody complex symbolism, in which space is directly 'lived' through associated images and symbols. "The 'lived' is the sensual world of everyday life - the space which the imagination seeks to change and appropriate" (Lefebvre 1991: 39). The first practice produces spaces as perceived, the second produces representations of space that allow space to be conceived, and the third transforms space into what is called 'representational spaces', i.e., space considered 'lived'. However, the most important of all to be discussed is the notion of representational or the 'lived' space, as portrayed in spatial form, building or urban setting. Lived space is a term used in Lefebvre's (Lefebvre & Nicholson-Smith, 1991) and Soja (Soja, 2009) works, where social relations occur and where we actively experience it in everyday life. In Lefebvre's study, it was shown that the society, namely the hegemonic class in many instances, produces a specific space - and capitalizes that space with its social practice (Elden, 2007).

Hence, this situation results in power and domination as a means of control existing within the space. In this Sense, Lefebvre's theory on space defines that space production also involves the abstraction of society's ideology, power practice and cultural spheres. For that matter, the spatial organisation that 'frames' our everyday lives reflect human forces and is defined by societal norms (Stanek, 2011). By bringing together, plural paradigms such as structuralism, discourse analysis and phenomenology, including the social and cultural theory on spatial programming with the study of architectural design, Dovey (2014) elaborates how human agents as the main social actors, have the power and capability to reframe, restructure and reconstruct the built space according to their desire and interest. In this Sense, those who have the power may determine the built space's nature due to their influence in society.

The value of space depends on how space is utilised and is determined by the inhabitants' perception towards the 'space' dynamic properties such as its location, direction, orientation, dimension, angles, axes, and other elements that may generate the space. In brief, the essential aspect identified in Weber (1995) work is that the meaning of 'space' is assigned by the inhabitants, depending on how one uses and experiences its dynamic characteristics. This notion is also supported by (Hillier, Hanson, & Graham, 1987), who firmly outlines the space-society relationship in which the living inhabitant space, which is made up of street patterns, can produce and promote global integration well as local identification (Griffiths, 2011). These attributes highlighted by the scholars above may influence and strengthen community, like propagating membership (a sense of belonging) through the lived space (Pierce & Martin, 2015). Many scholars agreed that the design space should stimulate choice, flexibility, promote interaction, and calibrate support for its user to promote the Sense of community within the 'lived' space (Rutanen, 2014; Zhongyuan Zhang, 2006). For this matter, the 'lived' spaces need to be well planned with appropriate strategies to develop a better sense of community and promote the feeling of attachment. This lived space propagates a sense of community in communal living involving shared open space, corridor, sidewalk, footpath, pedestrian, pathways, or covered street and wayfinding cues (refer to Table 2).

The built form is shaped by the symbolic, physical, social, and psychological functions it is expected to perform (Kropf, 2014). Although functionalism theory involves the technical process in the production of form, such as structural and mechanical functions, most scholars prefer to relate the concept of form to the functioning of human activities and the society's behavioural setting (Habraken, 2000). This is because collective human behaviour is the most common factor determining the general form and declares the form for what it is (Allweil, 2010). Most architectural theorists of the Modern Movement explain that the general form's shaping can be categorised into two general areas. The first area concerns the 'experience' of the social actor as constituted by the Kantian tradition in which form is a construction of human thought, governed by an individual's properties of mind through a cognitive process. The second area is the social actor's 'expression' through architecture (Weber, 1995).

As a result, the form mirrors the human cultures that produced it and defines society and how society's members lead their lives. As a manifestation of human culture, a social organisation can utilise the built form to symbolise aspirations, ambitions, or glory in society. In this Sense, the built form can be designed to promote a sense of community forms the basis of several fields of community design (refer to Table 2). This understanding indicates that the built environment makeup of spatial organisation and built form may influence community sense formation. However, in the Malaysian context, this Sense of community is not well implemented and portrayed in many elderly housing designs to guarantee the elderly quality of life. To understand this, the next section will elaborate on the issues relating to the development of living place for the emotional and safety needs of the elderly group in the Malaysian context that requires consideration and change in the future.

Table 2 Important aspects in designing spatial organisation and built form to promote a sense of community obtained from the literature review for the study determinants

| Features | Architectural elements | Spatial organisation and form making strategies for a sense of community in the built environment (WHAT?) |
|---------------------------------|--|--|
| Internal (Spatial organisation) | Site Planning Layout (Complex level). Site planning layout should have: i- Open / community shared space (Marcus, 2000) | ii- Strategic placement of open/ public shared space promotes social encounters via simple action and must not create an introvert 'ghetto' (Marcus, 2000). iii- Appropriate shape, dimension and location of open/ public shared space with user-friendly amenities for all aged groups and gender (Kim & Kaplan, 2004) iv- U shaped building complex should enclose and bounded the open /public shared space for the security of the user where the open shared space is radial centralized to encourage the user to engage with the entire Planning (Wilkinson, 2007) v- Design of open/public shared space should be conducive to life and multifunctional for many activities to be shared by all (Smith, 2011) vi- The open/ public shared space should have visual access from all direction and visible, surrounded by a subtle barrier (Francis et al., 2012) |

| | | |
|---------------------------------|---|---|
| | | <p>vii- The open/ public shared space should be barrier-free and free from vehicular entry (Zhen Zhang & Zhang, 2017)</p> <p>viii-The open /public shared space should have clear boundary separation or buffer to private living units entry for privacy like split level, hedge patio garden or planting screen. (Zhen Zhang & Zhang, 2017)</p> |
| Internal (Spatial organisation) | <p>Building Layout and Design (Block and Unit). The layout plan should be:</p> <p>i- Interweave between floors and units vertical or horizontally for continuous flow that promote walkability, which would enable residents to interact in their living complex (Lund, 2002)</p> | <p>ii- Shared shaded corridor with multi nodes as shared social space which is the prime location for casual encounters (Wood, Frank, & Giles-Corti, 2010)</p> <p>iii-Multi neighbourhood sidewalk, footpath, pedestrian pathways, or covered streets interweave and interconnected within the unit layout for casual social interaction with high visibility and natural daylighting to stimulate and increase social interaction (Lund, 2002)</p> <p>iv- Multi neighbourhood sidewalk, footpath, pedestrian pathways or covered street location and distance should be within walkability and accessibility, as it could affect inner neighbourhood travel behaviour, increasing social interactions.(Rogers & Sukolratanametee, 2009)</p> <p>v- Wayfinding cues within the unit layout through the usage of textured surface and interactive finishes for easy accessibility and social (Cornell, Sorenson, & Mio, 2003)</p> |
| External (Form -making) | <p>Building Form (Complex level). The built form should be:</p> <p>i- Identifiable, sensitive, and thoughtful to surrounding planning without boundaries (French et al., 2014)</p> | <p>ii- Universal design for the physical character (shapes, textures, materials, structure, scale, massing, colours, lighting) should blend with the surrounding context so that the elderly feel emotionally safe (Kadir & Jamaludin, 2013)</p> <p>iii-Built form styles (façade treatment) should be appropriate for the neighbourhood's quality and physical environment and not feel alienated and intimidated (Cerina, Fornara, & Manca, 2017). Facades create a lovely urban landscape and affect the accessibility of spaces (especially public ones) following the users' dynamics of needs and aspirations(Cerina et al., 2017).</p> |

Issues of elderly housing design in Malaysia

In general, to promote a sense of community for quality living from the built environment, two important aspects should be referred to at the internal and external levels. First is the spatial organisation, where the built environment should be conducive to elderly cognitive and active development. The social interaction involves physical and non-physical elements to produce a balanced context in terms of psychological aspects that impact elderly behaviours. Second is the physical built form and surrounding with the ergonomic–friendly structure for the elderly daily experience in having communal integration. About this, the two aspects above are vital to ensure a quality living environment. However, the senior living place's existing design in most Malaysian elderly housing is not suitable to cater to the needs of these elderly to propagate a sense of community for the benefit of quality living. In detail, two main issues can be identified in how current elderly housing are designed (Ismail & Zamry, 2020).

a) Lack of design spaces that promote social interactions towards enhancing the quality of living in elderly housing physical environment (Ismail & Zamry, 2020).

Referring to the previous study done on existing elderly care homes in Malaysia (Tobi et al., 2017), it is shown that many of the provided and available homes still lack awareness regarding the concept of universal design and its implementation (Khan & Tahir, 2014), as well as the unique housing requirements of the elderly population and persons with disabilities. The current living spaces are designed based on minimum living standards with less space for socialisation and communal interaction (Mohammad & Abbas, 2012). It is important to note that the concern over ageing is not just about the size of the old age population but, more importantly, about their health, welfare, care and living quality and arrangements, and the implications for infrastructure, housing, income, and economic growth. The built environment plays a role in defining the conditions for people to live healthy lives, and older people require high-quality built environments that suit their needs across the whole life course – a building stock and infrastructure that supports independent living and enhances the quality of life for the ageing population.

Therefore, a life that fulfils most households' desires and vital requirements while considering the changing essentials of households with elderly and aged people requires careful consideration. Otherwise, the lack of collaborative development among the elderly will have a significant impact on them. Data statistics from the World Health Organisation (WHO) highlighted that around 15% of the population age sixty years and above worldwide are affected by mental illness disease (Jankovic et al., 2014). One of the main problems contributing to this statistic is the lack of communal support, low living environment, and social interaction development among the elderly. This figure is expected to go even higher as 5% of the population will be aged yearly, and the percentage may increase (Tavares et al., 2016). This issue should not be continually ignored as data statistics have shown that an increasing number of elderly are susceptible to be involved in such cases. Therefore, this has called for a better solution to integrate appropriate spatial design, catering to elderlies' everyday activities and environment. The collaborative development through the living housing design can provide a better living ecosystem that propagates social quality and community among them for the long run.

b) Uninteresting built-form design contributes to a lack of social connection needs and affects elderly psychological development (Ismail & Zamry, 2020)

Currently, there are only nine homes for the older persons directly under the Department of Social Welfare management and financed by the Government, and these homes, known as Rumah Seri Kenangan, are located throughout the country (Hamid & Tyng, 2017). The objective is to provide proper care and protection for the needy elderly, treatment, and

better quality of life. More than one thousand occupants in these homes, and from the survey done, are packed and undermanaged. Even though activities and programmes are provided in these institutions like health services and therapy, religious studies, skill training, economic empowerment programme, lifelong learning, indoor and outdoor games, and recreational activities, further improvement is needed to better the living environment. The Ministry of Women, Family and Community Development has also established two homes for the chronically ill known as Rumah Ehsan (Hamid & Tyng, 2017). This home's objective is to provide a comfortable and tranquil surrounding, care, treatment, and shelter for those who are not self-sufficient and those with chronic illnesses. Out of two hundred occupants in these homes, more than a hundred of them are older persons. For elderly homes, funded by private bodies and NGO's registered under the Department of Social Welfare but privately or half-funded, it is estimated to be around thirty homes throughout the country. These homes, however, are not located in established building grounds purposely designed according to their function but usually are placed in temporarily rented terrace houses, shop lots or endowed land. The built form is at the minimum design using raw materials construction with minimal finishes.

Furthermore, there are no sensory elements to cater for the needs of the elderly movement and wayfinding within the building form (Akil, Abdullah, & Sipon, 2014). The elderly housing also is without the advancement of installations (Liew et al., 2019), services and interactive elements (Chua, Au-Yong, Ali, & Hasim, 2018), lack of elderly safety features (Yusnani, 2006) that can promote social interaction relating to comfort accessibility for the elderly (Rashid & Manan, 2013). Furthermore, many of these homes lack integrating the greenery and elements of nature to the living spaces and communal area (Aung, Nurumal, & Bukhari, 2017). This resulted in passive elderly who are not engage with their surroundings and the built environment. Hence, integrating the elderly from different backgrounds does not happen, resulting in living in isolation.

The issues highlighted above clearly indicate that there is still a lack in the design of local elderly homes that comprehensively promote social interaction and collaborative development among the elderly to propagate active living and positive ageing. Since there is no best design model of elderly homes in Malaysia, the next section will explain the study methodology and analysis technique using comparative analysis from a selected case study in the global context to derive the appropriate determinants and cross-check with indicators in Table 2 from the literature review. This is important to produce guidelines for designing better living elderly housing with a sense of community in the Malaysian context.

RESEARCH METHODOLOGY

This study utilises case studies as the research strategy under the framework of qualitative methods and approaches. For the data collection method, direct observation is used to observe the selected case studies. This is important to answer the study objectives to develop design strategies or guidelines for developing elderly housing design, focusing on community aspects as the central concept. The data obtained from the case study of the literature review are examined to develop the related determinants using the interpretivism method by the coding technique (hermeneutics) in reading the built environment as reliable ways to analyse and understand the design of elderly housing in the global context (Willis, Jost, & Nilakanta, 2007). This determinant is used to analyse the actual life case study of 3 elderly homes in Malaysia using direct observation and form the indicators for developing the questionnaires. The triangulation technique is adopted to examine data from the real-life case study and questionnaire. Data from both sources then are comparatively analysed and tabulated (Lauri, 2011). All collected data then

are finalised to propose the best possible design guideline and strategies for elderly housing to accommodate the needs of the elderly and architectural elements that can promote social interaction. This is important to achieve the study's objective in proposing design guidelines for elderly homes with a sense of communal values.

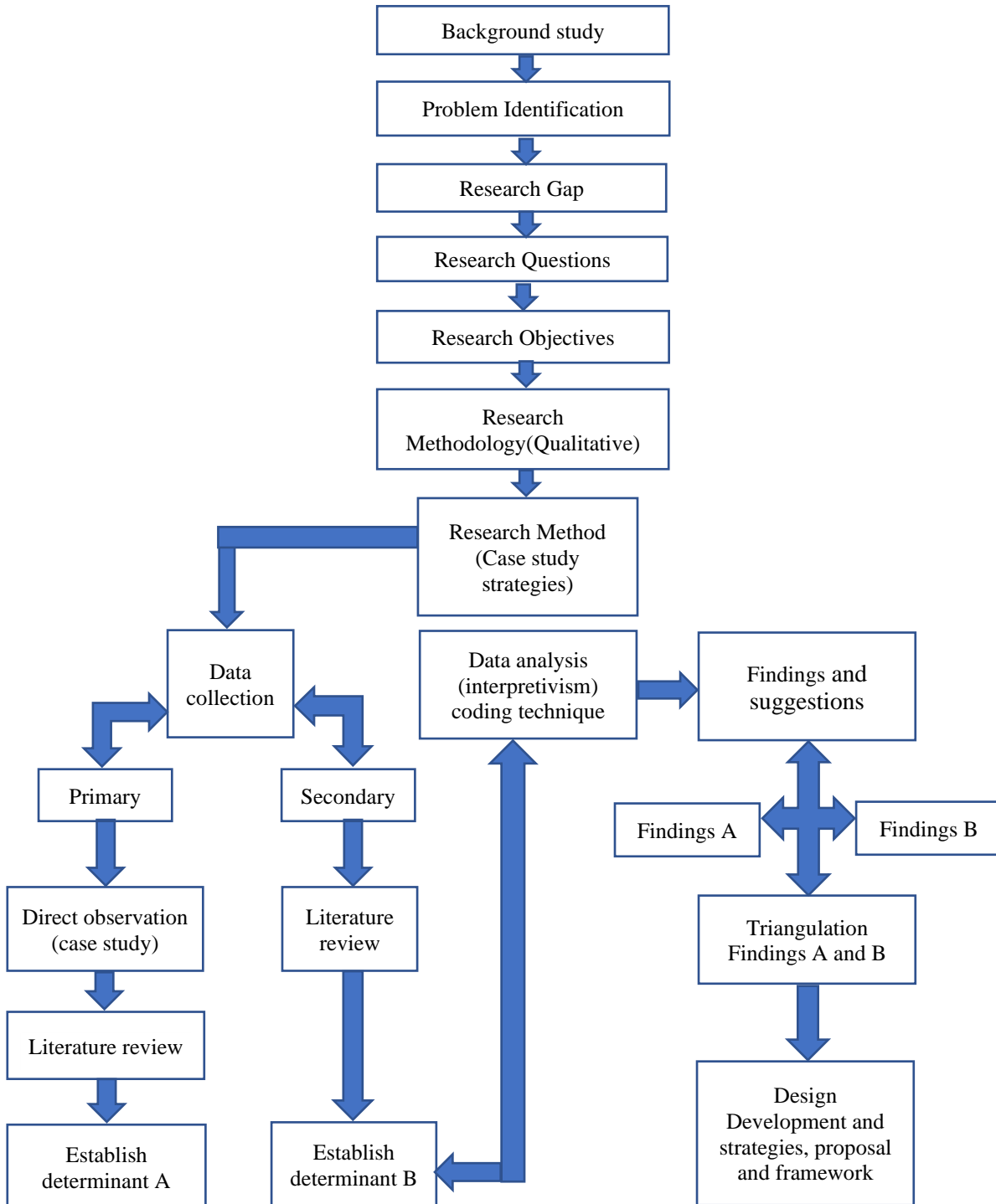


Fig. 2 Research framework to conduct the study

Determinants Relating to “Sense of Community”

This section discusses on the findings gathered from literature review on the five selected case study of prominent learning disabled school found in the global context, which is CS1) Elderly Home Wilder Kaiser, Austria CS2) Elderly Home Blancafort, Spain CS3) Elderly Home Andritz, Austria CS4) Elderly Home Riverside, Switzerland CS5) Elderly Home Six, California. These

five elderly homes are chosen as case studies based on the justification of the elderly housing category, which portrays the community's characteristics and elements well as the home success to address the needs of the elderly through its unique architectural design in terms of form and the spatial organisation. The literature reviews of case studies on the elderly housing from the global context, therefore, is conducted referring to two main indicators; internal and external level - A1) Internal elements (spatial organisation) comprise of A1i) open/public shared space A1ii) shared corridor A1iii) interconnected or interweave pathways and A1iv) wayfinding cues. A2) External elements (form-making) encompasses A2i) physical character A2ii) façade treatment. (Refer to Table 3).

From the literature review of case study exemplar from the global context the determinants involving internal and external level - A1) Internal elements (spatial organisation) comprise of A1i) open/public shared space A1ii) shared corridor A1iii) interconnected or interweaved pathways and A1iv) wayfinding cues. A2) External elements (form-making) encompasses A2i) physical character A2ii) façade treatment will be used to observe and analyse the case study of elderly housing in Malaysia. For that matter, 3 case studies of elderly housing planning in Malaysia are analysed in the following section involving Case study 1 (CS1) – Rumah Warga Emas Nur Ehsan; Case study 2 (CS2)- Rumah Orang Tua Ceria; Case study 3 (CS3) Rumah Amal Cheshire. The justification selection of these three-case study is based upon three main criteria. The first criteria refer to the housing category, which caters for self-sufficient and disabled seniors that offer security and social activities within the elderly living environment. The second criteria are based on the housing provider are the government sector known as DSW (Department of Social Welfare) and the non-governmental organisations (NGOs). The third criteria are according to the status of users utilize the homes, which are elderly who are functionally (Independent elderly) (healthy and active), debilitate elderly (need companionship from others), and the functionally (Dependent elderly) (assisted living). The case study analysis is also supported by conducting a questionnaire of elderly housing users living in these homes.

FINDINGS

Direct observation on elderly homes

From direct observation, the findings indicate that the existing elderly housing showed a lack of design in terms of internal elements (spatial organisation) and external elements (form-making). In this Sense, the local elderly housing design did not have various communal spaces that provide residents with passive and active recreational opportunities. The building site did not have ample open space that provided amenity in landscape design, daylight access and natural ventilation to dwellings, visual privacy, and opportunities for recreation and social activities. This includes no visual and physical connections between the development and the public domain that brings life into a development in which the communal space did not opens out to the street, not allowing residents to see street life for easier use by the public. The living units' dwellings also are not adaptable and not well accessible with proximity connections between related units.

In form-making, the housing-built form is not transparent and has many constraints, with borders and division, revealing non readily accepted façade, structures with un-defined access for the community. The façade did not promote a sense of openness that defines the unique architectural aesthetic and does not represent the interior function. The façade character and design did not attract the public domain; thus, no integration can occur between the elderly and the surrounding community. To support the findings from the direct observation conducted, 150 questionnaires were distributed to the elders representing each case study.

Table 3 Findings from a case study in the global context to derive related indicators in determining design strategies

| Case study from literature review in global context | A1) Internal elements (spatial organisation) | | | | A2) External elements (form-making) | |
|---|---|--|--|--|---|--|
| | A1i) Open/ public shared space | A1ii) Shared corridor with multi nodes | A1iii) Interconnected or interweaved pathways | A1iv) Wayfinding cues | A2i) Physical character | A2ii) Façade treatment |
| CS1- Elderly Home Wilder Kaiser, Austria | Provide centralized central shared garden to allow social interaction in big groups at the involved level. | Provide wide shaded corridor but is illuminated with daylight around the building complex with multi pleasant nodes to sit and relax like hardscape for casual social interaction. | Provide a main single visible spine route that interconnected with more minor paved pathways free of obstacles at each level to force the user to engage with the entire layout of the building. | Sensorial experience awareness of hand touch, smell and visual along the corridor pathway. | Provide elderly-friendly fittings and fixtures with appropriate height and numbers to gather in groups at the unit, block and complex level; | Provide visual representation, contextual integration, aesthetics elements (colour, rhythm). |
| CS2- Elderly Home Blancafort, Spain | Provide various individual shared gardens to allow social interaction in smaller groups within a group of living units at each floor level. | The shared corridor has varying visual references to ensure diverse free movement opportunities with matte levelled anti-slipping floors. | This central spine with anti-slipping paving act as an informal, casual interaction space for socialization | a) Have textured wall cladding allowing the user to navigate around the building through touch; | Provide elderly ambience setting using appropriate colours at interior and exterior comfortable to the elderlies. | This encourages the elderly to a better life with less environmental degradation and social awareness. |
| CS3- Elderly Home Andritz, Austria | | | | b) Corridor and pathway finish with colours that stimulate the eyesight. With a material selection of rubber to increase safety; | Use of universal design for building materials and main structures – staircase, floor, openings for easy accessibility and visibility that can encourage movement, communication, and interaction | |
| CS4- Elderly Home Riverside, Switzerland | | | | c) Along the corridor or pathway, have a planter box planted with distinct fragrant plants to stimulate smell perception for easy wayfinding | | |
| CS5- Elderly Home Six, California | | | | | | |
| | | | | | | |

Table 4 Findings from Observation of 3 cases study of elderly homes

| Cases study of elderly homes | A1) Internal elements (spatial organisation) | | | | A2) External elements (form-making) | |
|------------------------------|--|--|---|-----------------------|-------------------------------------|------------------------|
| | A1i) Open/ public shared space | A1ii) Shared corridor with multi nodes | A1iii) Interconnected or interweaved pathways | A1iv) Wayfinding cues | A2i) Physical character | A2ii) Façade treatment |
| CS 1 | X | X | / | X | X | X |
| CS 2 | / | / | X | X | X | X |
| CS 3 | / | / | X | X | X | X |

The justification for the number of sampling size respondents were determined referring to the number of elderlies between the age range of 65 to more than 85 years old at all three phases: independent, debilitate and dependent categories. The sampling size is also determined based on the benefits of the Central Limit Theorem that highlights the adequate size of the finite population. The respondents are also selected based on age group from various ethnicity with different cultural background. The elderlies are inquired about the indicators developed from the Sense of community indicators established from the literature review of case study exemplar from the global context that defines external and internal building features encompassing the internal and external level.

Table 5 Findings from the questionnaire on elderly for sense of community

| Findings from Questionnaire | A1) Internal elements (spatial organisation) | | | | | | A2) External elements (form-making) | | | | | |
|-----------------------------|---|-------------|---|-------------|--|-------------|--|-------------|--|-------------|---|-------------|
| | A1i) Comfort and quality for better health, social integration, leisure and activities, functional capacities, and environmental quality in Open/ public shared space | | A1ii) Provide a wide shared corridor with multi nodes that encourages casual social interaction | | A1iii) Have multiple interconnected or interweaved pathways for ease of movement | | A1iv) Provide many wayfinding cues from public communal spaces to individual living units. | | A2i) Has dominant physical character recognisable from far | | A2ii) Has façade treatment that promotes a sense of openness that defines the unique architectural aesthetic of a building and represent the interior function of a building. | |
| | Satisfied | Unsatisfied | Satisfied | Unsatisfied | Satisfied | Unsatisfied | Satisfied | Unsatisfied | Satisfied | Unsatisfied | Satisfied | Unsatisfied |
| CS 1 | 32% | 68% | 28% | 72% | 44% | 56% | 15% | 85% | 32% | 68% | 25% | 75% |
| CS 2 | 35% | 65% | 31% | 69% | 45% | 55% | 19% | 81% | 37% | 63% | 14% | 86% |
| CS 3 | 42% | 58% | 29% | 71% | 52% | 48% | 8% | 92% | 39% | 61% | 19% | 81% |

Questionnaire on Elderly for sense of community

The findings generally indicate that many elderly users felt that the Sense of community is not well apparently shown in the planning layout of the housing. Thus, this resulted in dissatisfaction among elderly users in terms of non-contextual responsiveness, inappropriate building envelope, unsuitable site planning and uncomfortable unit dwellings space, and lack of form-making qualities. Therefore, it has recommended that future elderly housing schemes design principles need to be justified and revisited as in the following section.

DISCUSSION (PROPOSED DESIGN STRATEGIES)

Designing for elderly housing is intricate to bring a better quality of life so that older people can continue to live the present moment in the best possible way. In this Sense, it is essential to shift away from the existing norm to a more holistic approach that emphasizes the internal and external elements of emotional and physical safety that shaped the elderly environment at the complex, block, and unit level (refer to Table 6). In brief, the implementation of appropriate building components in terms of form and space-making is essential in designing a living space that promotes social interaction for the elderly to meet their festive ageing needs. In summary, the guideline in designing elderly housing with consideration to a sense of community then is further enhanced and developed (refer to Table 7) based on the summary of findings from the literature review on the five existing cases studies in the global context (refer to Table 2 & Table 3), and the proposed design strategies from the author's point of view (refer to Table 6).

Table 6 Proposed Design Strategies for elderly housing at Complex, Block and Unit Level

| Elderly housing design Internal element | Complex level | Block-level | Unit level |
|---|--|---|--|
| <p>Spatial Organisation</p>  <p>Fig. 3 Centralised Planning with an open courtyard in the middle (4) is connected by nodes representing as (social interaction spaces - 1,2,3,5, 6 and 7) in the overall complex Planning from ground floor to upper levels to promote space for socialization and communal interaction among elderly according to phases – ground level is for a larger group, the second level is for the smaller group followed by upper levels for personalized group interaction</p> | <p>Should adopt centralised design planning to force the user to engage with the layout of the building. This centralized planning is connected to community spaces to promote social interaction among the elderly to make them more active towards positive ageing (refer to Figure 3).</p> <p>Should have outdoor courtyard space to become an attachment place to the main building that allows the elderly to improve their physical and psychological aspect in life and socialize in a natural ambience (refer Figure 4).</p>  <p>Fig. 4 Courtyards play a vital role in influencing the physical and social facets of the elderly. Based on the definition, the open environment's intent favoured by the pensioner involves gathering the elderly group for a leisure experience. Hence the outdoor Courtyard should be physically designed connected or visually connected to the inside spaces</p> | <p>There should be visible and transparent connectivity between indoor and outdoor social interaction nodes and spaces at all levels linked to the living blocks. This will maximize the access to all social interaction spaces for the elderly at each level (refer to Figure 5)</p>  <p>Fig. 5 Sectional building indicates that shared communal space is located at all levels.</p> | <p>Should have appropriate ambience with suitable fixture and fittings that encourages movement and access from the living units to other community spaces within the building levels. This available facility promotes the elderly to move independently, as it allows them to manoeuvre from living units to the provided community space of their own will. The positioning of these fittings defined the space as quality spaces because it gives ease for the end-user (refer to Figure 6)</p>  <p>Fig. 6 Living units and other spaces within the building complex have an installation of fittings that helps to ease the movement of the elderly. This promotes the elderly to interact within the space provided through wayfinding to direct the elderly within the building complex to social community spaces.</p> |

Table 7 Established design guideline for elderly housing with 'sense of community' encompassing internal and external elements

| Internal and external elements | Design Elements for the Sense of community | Description | Explanation |
|---|--|---|--|
| (Internal) Spatial organisation (Feddersen & Lüdtkke, 2012) | Courtyard or green space configuration (Zaff & Devlin, 1998) | Location, orientation, wall enclosure, size, composition, placing natural elements within the Courtyard and relationship of Courtyard with inner space of the building (Yari, Lee, Cassidy, & Chen, 2020) | <ul style="list-style-type: none"> • The Courtyard location in semi-enclosed design, exposure to the sky or surrendered by only two walls will nurture a sense of community and encourage social interaction (Regnier, 2018). • The correct orientation of the Courtyard helps to develop indoor thermal comfort; this is important to promote space for interaction for all elderly members and encourage the elderly's community to act as a group (Filonenko & Schekaleva, 2020). • Courtyard wall enclosure components such as walls, doors and windows need to be considered during the design stage as it can be in the form of screening, or half walled is conducive for visual privacy and a noise barrier between the courthouse and outside area. • Size plan of Courtyard according to ratio width, length and height should be suitable with its function and activities as a social interaction space to accommodate groups gatherings • Composition of Courtyard should comprise of spinal cluster courtyard as well as multiple and interlink, outdoor semi-public courtyard planning at the different floor and for different purposes (Kearney & Winterbottom, 2006) • Placing natural elements like trees, shrubs, and flower plants (as a garden element) within a courtyard can significantly affect thermal comfort as they provide a shaded area within a courtyard for environmental benefits. This will become a comfortable space for social interaction (Filonenko & Schekaleva, 2020). |
| | The indoor-outdoor spatial relationship (Yanli, 2015) | Clear visual linkage and access (O'Malley, Innes, Muir, & Wiener, 2018) | <ul style="list-style-type: none"> • Connection and linkages between indoor and outdoor create a free flow of movement throughout the housing complex. This promotes engagement between the elderly and the space. As an outcome, indoor and outdoor quality can be much appreciated and fully functional as a communal area. • The spatial and visual linkage between indoor and outdoor environments is emphasized not only because of the fun appreciation of the outdoors but rather to motivate older people to use the outdoors. |
| | Space attachment | Cues for Wayfinding (Marquardt, 2011) | <ul style="list-style-type: none"> • Wayfinding is essential to direct the elderly and movement within the built environment for engaging with other elderlies. The elderly need to have cues that allow them to mark the reference point for maneuvering around that trigger their memory of the spaces through sightings. • Use multiple cues from building elements, floor markings, colours coding, texture, pattern, artwork, and signage, which can be seen from a distance to help residents understand where they are, their destination, and how to get there and back. |
| | | Walkable walking distance (Forsyth & Southworth, 2008) | <ul style="list-style-type: none"> • The location for elderly activity spaces need to be correctly positioned within a reachable distance that will not tire off the elderly. The short distances from indoor to outdoor space or resting space that acts as a buffer will encourage the elderly to utilize the space and have a social activity or interaction with other occupants. |

| | | | |
|---|---|--|--|
| | | Interweave corridor and pedestrian pathways connecting public and private space zoning (O'Malley et al., 2018) | <ul style="list-style-type: none"> • A double-loaded corridor and pedestrian pathway-oriented environment focusing on the walkability aspect would enable residents to interact within their building complex; it will likely enhance the residents' Sense of community. |
| | | Creating a community shared space (Kerr, Rosenberg, & Frank, 2012) | <ul style="list-style-type: none"> • Creating 'quasi-public spaces' or 'micro spaces, such as station forecourts within the housing complex, functioned as community shared space. Many of these spaces have been characterized as 'everyday spaces' a term that conveys something of their casual, daily, functional use |
| | | Creating ample pocket spaces (Demirbilek & Demirkan, 2004) | <ul style="list-style-type: none"> • Creating pocket spaces as resting nodes and refuge is essential along the pathways and corridor for the elderly. • Pocket spaces should be relaxing, with opportunities to stop and linger, with good quality, comfortable and preferably moveable formal seating, informal seating opportunities. |
| | | Visibility, Surveillance, Safety and accessibility (Danziger & Chaudhury, 2009) | <ul style="list-style-type: none"> • Primary and secondary communal spaces should have apparent visual permeability to ensure the safety of the elderly. The communal spaces should be oriented and circulated facing living units for better surveillance |
| | | Flexibility and diverse of communal space (avoiding one size fits all) (Danziger & Chaudhury, 2009) | <ul style="list-style-type: none"> • Communal space will, or should, cater equally to every elderly or for every occasion despite their different lifestyle and backgrounds. |
| (External) Form making and finishing (Feddersen & Lüdtke, 2012) | Elderly friendly features (universal building design) | Appropriate fittings, fixtures and flexible types of furniture (Zaid, Yamin, & Yaacob, 2019) | <ul style="list-style-type: none"> • The housing complex should be equipped and installed with appropriate fittings and fixtures in various designs, shapes, and functions that suit elderly needs at all floor levels to ease the movement of the elderly. E.g. –hand railings, ramps, the door opening and hallway width should be at least 3.5 feet wide to allow for easy wheelchair movement. • Amenities space need to be equipped with reconfigurable furniture to accommodate various types of events—lectures, musical programs, films—that create opportunities for residents to meet and mingle with their neighbours from the surrounding community. |
| | | Colours (avoid pale colours). Creates an exact, visually appealing focal point (Leung, Famakin, & Wang, 2019) | <ul style="list-style-type: none"> • Using light colours of brown or light yellow psychologically will make the elderly feel more comfortable and secure. These colours also able to create a welcoming and pleasant ambience. Besides, the green and blue colour is the contrast colour, giving the same ambience of calming to the eyes. • According to the research study, a room with the right shade of green and blue can promote security, balance and healing sensation to the building occupants. This will promote positive feeling and improve moods for the elderly to socialize and be with others |

| | | | |
|--|--|--|---|
| | | <p>Building materials finishes and structure, texture (Leung et al., 2019)</p> | <ul style="list-style-type: none"> • Flooring materials in living units, hallways and corridors need to be slip-resistant for ease of travel and movement and comfort for underfoot like vinyl and rubber. • As many older people like to spend time walking or wandering in corridors, it makes Sense to provide a safe form of tactile and fun stimulation. Walls along the corridor and pathways can be installed with the three-dimensional wall-mounted panel tactile and activate the elderly senses. This will encourage them to interact while doing this activity. • Best to use sustainable construction materials for building structures as it is non-toxic but entirely environmentally friendly. This will give a surrounding natural ambience for the elderly to feel comfortable and encourage positive ageing. |
| | | <p>Lighting (Shikder, Mourshed, & Price, 2012)</p> | <ul style="list-style-type: none"> • Punching light to the core of poorly lit spaces and ensure that there will always have lights along at the end of the corridor. Properly lighted areas will ensure a safe and secure living complex. • Lightings should be ample but not glaring as it will affect mobility for the elderly. |
| | | <p>Façade Style, treatment and scale (Cerina et al., 2017)</p> | <ul style="list-style-type: none"> • Create a "home-like" appearance façade style that emphasis on a humanized architectural scale will provide higher anticipated residential satisfaction and a decreased feeling of broken home attachment) • Avoid façade style appearance (i.e. "hotel-like" and the "usual-standard" facilities) (Cerina, V., Fornara, F., & Manca, S. (2017). |

CONCLUSIONS

From the above, it is shown that in designing housing for the elderly with a sense of community, two main aspects should be emphasised in order to fulfil the needs of the elderly. These are the internal elements like spatial organisation: Courtyard or green space configuration, indoor-outdoor spatial relationship, and space attachment. The second is the external elements which is the form making and finish, comprised of elderly-friendly features (universal building design): fittings, fixtures and furniture settings, usage of colours, building materials and finishes, lighting and façade style treatment and scale. These aspects are crucial as they could lead to a conducive living environment that can promote a sense of community among the elderly for an active lifestyle. This study may help construct a new development scheme towards the approach of consciously designed elderly housing according to the needs of the new generation of elderlies that are more open to society than living in isolation. By having a deeper understanding of the elderly needs, the outcome of the future built environment can provide more than just the minimum requirement for the elderly housing but instead focuses on the sense of community role for its design emphasis. The government and relevant authorities should work together with elderly housing providers, developers, and designers to provide better living places to elevate the life quality for the elderly towards positive ageing and improve their health development. This is vital in discovering the elderly's full potential and better living in the future.

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REFERENCES

- Aini, A. M., Murni, N., & Abd Aziz, W. N. A. W. (2016). Housing aspirations of the elderly in Malaysia: A comparison of urban and rural areas. *Journal of Design and Built Environment*, 16(2).
- Akil, S. M. S., Abdullah, S., & Sipon, S. (2014). Challenges in managing elderly care centres in Malaysia. *International Journal of Arts & Sciences*, 7(3), 129.
- Alexandre, T. d. S., Cordeiro, R. C., & Ramos, L. R. (2009). Factors associated to quality of life in active elderly. *Revista de saude publica*, 43, 613-621.
- Allweil, Y. (2010). Beyond the spatial turn: architectural history at the intersection of the social sciences and built form. The Proceedings in The International Conference of Spaces of History/Histories of Space: Emerging Approaches to the Study of the Built Environment, College of Environmental Design 2010, UC Berkeley, USA, (1) 1-9
- Aung, K., Nurumal, M. S., & Bukhari, W. (2017). Loneliness among elderly in nursing homes. *International Journal for Studies on Children, Women, Elderly and Disabled*, 2, 72-78.
- Beqaj, B., Rizvanolli, B. V., & Hasimja, G. (2015). Creating Urban Sense of Community through Façades., The Proceedings in UBT International Conference on Architecture and Spatial Planning 2015, University Business Centre of Technology, Kosovo, (53) 9-14
- Cantarero, R., Potter, J. J., & Leach, C. K. (2007). Perceptions of quality of life, sense of community, and life satisfaction among elderly residents in Schuyler and Crete, Nebraska. *Architecture Program: Faculty Scholarly and Creative Activity*, 4. retrieved from https://digitalcommons.unl.edu/arch_facultyschol/4 on the 28/7/2021
- Cerina, V., Fornara, F., & Manca, S. (2017). Architectural style and green spaces predict older adults' evaluations of residential facilities. *European Journal of Ageing*, 14(3), 207-217.
- Chavis, D. M., Lee, K. S., & Acosta, J. D. (2008). *The sense of community (SCI) revised: The reliability and validity of the SCI-2*. Paper presented at the 2nd international community psychology conference, Lisboa, Portugal.
- Chavis, D. M., & Wandersman, A. (2002). Sense of community in the urban environment: A catalyst for participation and community development. In *A Quarter Century of Community Psychology* (pp. 265-292): Springer.
- Chua, S. J. L., Au-Yong, C. P., Ali, A. S., & Hasim, M. S. (2018). Building maintenance practices towards the common defects and resident's satisfaction of elderly homes. *Journal of Design and Built Environment*, 62-71.
- Cornell, E. H., Sorenson, A., & Mio, T. (2003). Human sense of direction and wayfinding. *Annals of the Association of American Geographers*, 93(2), 399-425.
- Danziger, S., & Chaudhury, H. (2009). Older adults' use of adaptable design features in housing units: An exploratory study. *Journal of Housing for the Elderly*, 23(3), 134-148.
- Demirbilek, O., & Demirkan, H. (2004). Universal product design involving elderly users: a participatory design model. *Applied Ergonomics*, 35(4), 361-370.
- Dovey, K. (2014). *Framing places: Mediating power in built form*: Routledge.
- Elden, S. (2007). There is a politics of space because space is political: Henri Lefebvre and the production of space. *Radical Philosophy Review*, 10(2), 101-116.
- Feddersen, E., & Lüdtke, I. (2012). *Living for the elderly: a design manual*: Walter de Gruyter.
- Fernández-Ballesteros, R., Kruse, A., Zamarrón, M. D., & Caprara, M. (2007). 12. Quality of Life, Life Satisfaction, and Positive Aging. *GeroPsychology: European Perspectives for an Aging World*, 197.
- Filonenko, E., & Schekaleva, M. (2020). *Creating a Safe Environment in Apartment Courtyard Design*. Paper presented at the IOP Conference Series: Materials Science and Engineering.
- Forsyth, A., & Southworth, M. (2008). Cities afoot—Pedestrians, walkability and urban design. In: Taylor & Francis.
- Francis, J., Giles-Corti, B., Wood, L., & Knuiman, M. (2012). Creating sense of community: The role of public space. *Journal of Environmental Psychology*, 32(4), 401-409.

- French, S., Wood, L., Foster, S. A., Giles-Corti, B., Frank, L., & Learnihan, V. (2014). Sense of community and its association with the neighborhood built environment. *Environment and behavior*, 46(6), 677-697.
- Gong, S.-J., & Kim, K.-H. (2010). Factors related to meaning in life in elderly. *Korean Journal of Adult Nursing*, 22(4), 438-447.
- Gonyea, J. G., Curley, A., Melekis, K., & Lee, Y. (2018). Perceptions of neighborhood safety and depressive symptoms among older minority urban subsidized housing residents: the mediating effect of sense of community belonging. *Aging & Mental Health*, 22(12), 1564-1569.
- Griffiths, S. (2011). Temporality in Hillier and Hanson's theory of spatial description: Some implications of historical research for space syntax. *The Journal of Space Syntax*, 2(1), 73-96.
- Habraken, N. J. (2000). *The structure of the ordinary: form and control in the built environment*: MIT press.
- Hamid, T. A., & Tyng, C. S. (2017). Meeting the needs of older Malaysians: Expansion, diversification and multi-sector collaboration. *Malaysian Journal of Economic Studies*, 50(2), 157-174.
- Hannon III, L., Sawyer, P., & Allman, R. M. (2012). The influence of community and the built environment on physical activity. *Journal of aging and health*, 24(3), 384-406.
- Heywood, A. (2016). *Local housing, community living*. The Smith Institute: London.
- Hillier, B., Hanson, J., & Graham, H. (1987). Ideas are in things: an application of the space syntax method to discovering house genotypes. *Environment and Planning B: planning and design*, 14(4), 363-385.
- Ismail, A. S., & Zamry, M. N. H. (2020). The Relationship between Socio-Spatial and Elderly Cultural Values Towards a Sustainable Senior Retirement Housing. *International Journal of Psychosocial Rehabilitation*, 24(06).
- Ismail, H., Halil, F. M., Abidin, A. W. Z., & Hasim, M. S. (2020). The Elderly (Senior) Housing Preferences among Generations in Malaysia. *Environment-Behaviour Proceedings Journal*, 5(13), 145-154.
- Jankovic, N., Geelen, A., Streppel, M. T., De Groot, L. C., Orfanos, P., Van Den Hooven, E. H., . . . Bobak, M. (2014). Adherence to a healthy diet according to the World Health Organization guidelines and all-cause mortality in elderly adults from Europe and the United States. *American Journal of Epidemiology*, 180(10), 978-988.
- Jolanki, O., & Vilkkko, A. (2015). The meaning of a "sense of community" in a Finnish senior co-housing community. *Journal of Housing for the Elderly*, 29(1-2), 111-125.
- Jung, E., Lee, J., & Kim, K. (2015). The relationship between pedestrian environments and sense of community in apartment complexes in Seoul, Korea. *Journal of Asian Architecture and Building Engineering*, 14(2), 411-418.
- Kadir, S. A., & Jamaludin, M. (2013). Universal design as a significant component for sustainable life and social development. *Procedia-Social and Behavioral Sciences*, 85, 179-190.
- Kearney, A. R., & Winterbottom, D. (2006). Nearby nature and long-term care facility residents: Benefits and design recommendations. *Journal of Housing for the Elderly*, 19(3-4), 7-28.
- Kerr, J., Rosenberg, D., & Frank, L. (2012). The role of the built environment in healthy aging: Community design, physical activity, and health among older adults. *Journal of planning Literature*, 27(1), 43-60.
- Khan, A. R., & Tahir, I. (2014). Influence of Social Factors to the Quality of Life of the Elderly in Malaysia. *Open Medicine Journal*, 1(1).
- Kim, J., & Kaplan, R. (2004). Physical and psychological factors in sense of community: New urbanist Kentlands and nearby Orchard Village. *Environment and Behavior*, 36(3), 313-340.
- Kropf, K. (2014). Ambiguity in the definition of built form. *Urban morphology*, 18(1), 41-57.
- Lauri, M. A. (2011). Triangulation of data analysis techniques. *Papers on Social Representations*, 20(2), 34.31-34.15.
- Lefebvre, H., & Nicholson-Smith, D. (1991). *The production of space* (Vol. 142): Oxford Blackwell.

- Leung, M.-y., Famakin, I. O., & Wang, C. (2019). Developing an integrated indoor built environment–quality of life model for the elderly in public and subsidized housing. *Engineering, Construction and Architectural Management*.
- Liew, N. Y., Chong, Y. Y., Yeow, S. H., Kua, K. P., San Saw, P., & Lee, S. W. H. (2019). Prevalence of potentially inappropriate medications among geriatric residents in nursing care homes in Malaysia: a cross-sectional study. *International Journal of Clinical Pharmacy*, 41(4), 895-902.
- Lund, H. (2002). Pedestrian environments and sense of community. *Journal of Planning Education and Research*, 21(3), 301-312.
- Magnus, G. (2012). *The age of aging: How demographics are changing the global economy and our world*: John Wiley & Sons.
- Maher, M. A. (2005). The evolving meaning and influence of cohort membership. *Innovative Higher Education*, 30(3), 195-211.
- Mannarini, T., & Fedi, A. (2009). Multiple senses of community: The experience and meaning of community. *Journal of Community Psychology*, 37(2), 211-227.
- Marcus, C. C. (2000). Site planning, building design and a sense of community: An analysis of six cohousing schemes in Denmark, Sweden, and the Netherlands. *Journal of Architectural and Planning Research*, 146-163.
- Marquardt, G. (2011). Wayfinding for people with dementia: a review of the role of architectural design. *HERD: Health Environments Research & Design Journal*, 4(2), 75-90.
- McMillan, D. W., & Chavis, D. M. (1986). Sense of community: A definition and theory. *Journal of community psychology*, 14(1), 6-23.
- Merry, S. K., & Simon, A. (2012). *Living and Lurking on LiveJournal: The benefits of active and non-active membership*. Paper presented at the Aslib Proceedings: new information perspectives.
- Mohammad, N. M. N., & Abbas, M. Y. (2012). Elderly environment in Malaysia: Impact of multiple built environment characteristics. *Procedia-Social and Behavioral Sciences*, 49, 120-126.
- Moustafa, Y. M. (2009). Design and Neighborhood Sense of Community: An Integrative And Cross-Culturally Valid Theoretical Framework. *ArchNet-IJAR*, 3(1).
- Nooraisyilah, M. (2017). *Assessment and comparison of the housing needs and aspirations of urban and rural elderly in Malaysia/Nooraisyilah Murni*. University of Malaya.
- O'Malley, M., Innes, A., Muir, S., & Wiener, J. (2018). "All the corridors are the same": a qualitative study of the orientation experiences and design preferences of UK older adults living in a communal retirement development. *Ageing and Society*, 38(9), 1791-1816.
- Patricia, M. B. (2000). Meaning in life among the elderly. *Journal of Korean Academy of Nursing*, 30(2), 259-271.
- Pierce, J., & Martin, D. G. (2015). Placing Lefebvre. *Antipode*, 47(5), 1279-1299.
- Portal, D. o. S. M. O. (2020). Retrieved from <https://www.dosm.gov.my/v1/>.
- Procentese, F., De Carlo, F., & Gatti, F. (2019). Civic engagement within the local community and sense of responsible togetherness. *TPM: Testing, Psychometrics, Methodology in Applied Psychology*, 26(4).
- Rashid, A., & Manan, A. A. (2013). The Quality of life of Elderly Living in a Home for the aged in Penang Malaysia. *Middle East Journal of Age & Ageing*, 10(2).
- Regnier, V. (2018). *Housing design for an increasingly older population: redefining assisted living for the mentally and physically frail*: John Wiley & Sons.
- Rogers, G. O., & Sukolratanamettee, S. (2009). Neighborhood design and sense of community: Comparing suburban neighborhoods in Houston Texas. *Landscape and Urban Planning*, 92(3-4), 325-334.
- Rutanen, N. (2014). Lived spaces in a toddler group: Application of Lefebvre's spatial triad. In *Lived spaces of infant-toddler education and care* (pp. 17-28): Springer.
- Shikder, S., Mourshed, M., & Price, A. (2012). Therapeutic lighting design for the elderly: a review. *Perspectives in public health*, 132(6), 282-291.

- Smith, K. M. (2011). The relationship between residential satisfaction, sense of community, sense of belonging and sense of place in a Western Australian urban planned community.
- Soja, E. W. (2009). Taking space personally. *The spatial turn: Interdisciplinary perspectives*, 11-35.
- Stanek, L. (2011). *Henri Lefebvre On Space: Architecture, Urban Research, And The Production Of Theory*: U of Minnesota Press.
- Tavares, D. M. d. S., Matias, T. G. C., Ferreira, P. C. d. S., Pegorari, M. S., Nascimento, J. S., & Paiva, M. M. d. (2016). Quality of life and self-esteem among the elderly in the community. *Ciencia & saude coletiva*, 21, 3557-3564.
- Tobi, S. M., Fathi, M., & Amaratunga, D. (2017). *Ageing in place, an overview for the elderly in Malaysia*. Paper presented at the AIP conference proceedings.
- Weber, R. (1995). On the Aesthetics of Architecture a Psychological Approach to the Structure and the Order of Perceived Architectural Space.
- Wilkinson, D. (2007). The multidimensional nature of social cohesion: Psychological sense of community, attraction, and neighboring. *American Journal of Community Psychology*, 40(3-4), 214-229.
- Willis, J. W., Jost, M., & Nilakanta, R. (2007). *Foundations of qualitative research: Interpretive and critical approaches*: Sage.
- Wilson, J. (2013). "The Devastating Conquest of the Lived by the Conceived" The Concept of Abstract Space in the Work of Henri Lefebvre. *Space and Culture*, 16(3), 364-380.
- Wood, L., Frank, L. D., & Giles-Corti, B. (2010). Sense of community and its relationship with walking and neighborhood design. *Social science & medicine*, 70(9), 1381-1390.
- Yanli, Z. (2015). *Elderly Residential Space Design and Analysis: A Review*. Paper presented at the International Conference on Advances in Mechanical Engineering and Industrial Informatics.
- Yari, M., Lee, K., Cassidy, J., & Chen, Z. (2020). Transforming Space into Place: A Person-Environment Interchange Approach for Designing an Assisted Living Facility Courtyard. *Journal of Aging and Environment*, 1-19.
- Yu, R., Wong, M., & Woo, J. (2019). Perceptions of neighborhood environment, sense of community, and self-rated health: an age-friendly city project in Hong Kong. *Journal of Urban Health*, 96(2), 276-288.
- Yusnani, M. Y. (2006). Accommodating the Malaysian elderly: the cultural precursors. *Ageing International*, 31(3), 185-202.
- Zaff, J., & Devlin, A. S. (1998). Sense of community in housing for the elderly. *Journal of Community Psychology*, 26(4), 381-398.
- Zaid, S. M., Yamin, A. A., & Yaacob, N. M. (2019). The Environmental Study on Ageing in Place: The Design Practice Compliance to Accessibility Legislation and Standards in Malaysia for Elderly Home Environment. *Ekoloji Dergisi*(107).
- Zhang, Z. (2006). What is lived space. *Ephemera*, 6(2), 219-223.
- Zhang, Z., & Zhang, J. (2017). Perceived residential environment of neighborhood and subjective well-being among the elderly in China: A mediating role of sense of community. *Journal of Environmental Psychology*, 51, 82-94.