BIOPHILIC ARCHITECTURE FOR THE SALUTOGENIC WELL-BEING OF ELDERS
A focus on Elderly Care Centre Design

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Abstract: The condition of the built environment acts as a determining factor in the health of its occupants. Elders as a user category benefit from having a built environment that promotes well-being. Generally, responses formulated within the built environment focus on the physical health of elders. This study goes beyond that limitation and considers the complex cognitive and psychological needs of elders residing in Elderly Care Centre facilities. Though the application of the theory of Salutogenesis and Biophilic Architecture characteristics in the design of Elderly Care Centres has been researched independently, studies that look into the combined application of both aspects and their impact are a research gap that is explored in this study. It utilises a mixed-method approach, focusing on a selected case study, an Elderly Care Centre in a suburban area of Sri Lanka. Data is gathered through questionnaire surveys, on-site interviews, and activity mapping to evaluate existing salutogenic conditions. Computational three-dimensional models are then generated to virtually develop the existing spaces and re-evaluate the subjective salutogenic experiences of elders. Findings of the research elaborate on how the application of biophilic architecture attributes has impacted Elders' salutogenic health domains and their balance. The framework, developed with consideration for stakeholder inputs, consists of architectural implications useful for future design processes.

Keywords: *Salutogenesis, Biophilic Architecture, Elder Care*

1. Introduction

Designing spaces for sensitive groups of people could be challenging, due to the unique necessities and conditions of the user group. Therefore, designers should be cautious in creating inclusive & resilient spaces for such users. Elders are one such user category, while ageing itself is a process which creates a rather complex experience of emotions and a transition of life for humans, along with many physical, mental and social challenges. With the global increase in the elderly population and added effects from changing social patterns, the utilisation of Elderly Care Centres (ECC) has increased. Thus, it is of vital importance for them to be designed to cater for the diverse needs and challenges of senior citizens.

Enhancement of Salutogenic well-being in these facilities could be utilised as an approach to cater for this need, and Biophilic Architecture, which is a highly potent branch of architecture that could lead to the design of spaces with such intention, can be considered as a mediator in achieving this goal. Therefore, this research is focused on the aim of exploring the impact of Biophilic Architecture attributes on improving the Salutogenic well-being of elders, residing in ECC and to develop a stakeholder-driven framework to realise the actual needs of elders.

Thus, the primary objectives of the study are defined as;

- To determine the gaps in the existing ECC design guidelines that could be improved by the inclusion of Biophilic Architectural Attributes that can assist in improving the salutogenic well-being of elders.
- To explore the impact of Biophilic Architecture Attributes on improving the Salutogenic well-being experience of elders residing in ECC.
- To develop a stakeholder-driven framework, to include the needs of elders in designing the built environment in ECC.

2. Background

The literature presents the two main theories used in the research, the Salutogenesis Theory and Biophilic Architecture.

2.1. SALUTOGENESIS

Salutogenesis is the study of the origins of health and focuses on factors that support human health and well-being, rather than on factors that cause disease. The word Salutogenesis originates from the Latin word 'Salus', which means 'health' and the Greek word 'genesis', which means 'origin'. Salutogenesis is explicit in the model as an analytical approach and is specified through health promotion, being oriented towards resources and positive health. In contrast to Salutogenesis,

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there is Pathogenesis, which is the study of the process by which a disease or disorder develops (Antonovsky, 1987). The salutogenic model of health posits that life experiences and how an individual views their life (either positively or negatively) influence their health (Hewis, 2023). Out of these two approaches, currently, there is a research impetus on the Salutogenic approach for well-being and development in health. (Drageset et. el., 2023)

The Sense of Coherence (SOC) is the core construct within the salutogenic model. It's a global orientation reflecting how people view life and use resources to cope with challenges. Three components make up SOC: comprehensibility, meaningfulness, and manageability. A global orientation that expresses the degree to which one has a pervasive, enduring, though dynamic, feeling of confidence that (1) the stimuli from one's internal and external environments in the course of living are structured, predictable, and explicable; (2) one has the resources available to meet the demands posed by these stimuli; and (3) these demands are challenges, worthy of investment and engagement, can be considered as the original definitions for these three components (Moksnes, 2021).

It has frequently been supposed that old age is an accretion of losses compelling elders to familiarise and adapt to constantly changing physical and social challenges. In most situations, elders establish great resilience to adapt with a range of diverse approaches to overcome these challenges. However, over time, the accessible opportunities become fewer as a result of declining resources and capabilities. This can influence the elders' mental and psychological health and increase the risk of social isolation and loneliness (Golembiewski, 2010). Thus, it is of great importance to design inclusive & resilient spaces to overcome such complex situations. Elders who could be leading monotonous lifestyles, especially those who will be ageing in place within facilities like ECC, can benefit by having these components of SOC for the creation of a salutogenic environment, in the spaces they live in (d'Hombres et al., 2021).

2.2. BIOPHILIC ARCHITECTURE

Designing habitats which include design mechanisms and design strategies to improve the overall salutogenic quality of a space is highly beneficial for its inhabitants. There could be various approaches, based on which, the quality of spaces could be salutogenically improved. However, this study intends to investigate further into the manner in which such intent could be achieved, through one specific theoretical area, which is the utilisation of Biophilic Architecture attributes into spaces.

The biophilia hypothesis points out the circumstance that humans are longing for connections with nature for artistic, intellectual, and cognitive experiences, as well as for spiritual connections in finding the true meaning of life. Humans themselves, being a part of nature, have an innate love of it that is imprinted into their genomes (Mitchell, 2018). Biophilia has been linked to many environmental psychology-related theories. Examples of such theories are;

- Prospect-refuge theory, (Dosen & Ostwald, 2016) which discusses the fact that under the prospect of how people could be mentally satisfied, with the opportunities to enjoy nature, without being seen, such as on a mountain cliff.
- In stress recovery theory, which explains the fact that exposure to unthreatened nature can improve the positive emotions of humans, and this could further be supported by various natural elements, such as water (Ulrich, 2024).
- Attention Restoration theory discusses on the fact that how connection with the natural environment relaxes the mental fatigue of humans and helps in improving cognitive functions. It further states that having connections does not require much cognitive energy of mind, thus providing a chance for the reduction of mental fatigue (Ohly et al., 2016).

Numerous scientists, ecologists, and architects have contributed to the development of ideas, philosophies, and ideologies related to Biophilic Architecture and design in order to enable and expand the depth of research into this field. Since Biophilic Architecture is a rapidly expanding topic of architecture, over the past two decades, a great deal of research and findings have been made in this study area. Just a handful of these to be mentioned would be,

- 6 principles of Biophilic Design (Kellert, 2008)
- 14 patterns of biophilic design by Terrapin Bright Green LLC (Ryan et al., 2014)
- 25-point biophilic framework (Kellert & Calabrese, 2015)

The approaches present a list of essentials or a framework that may be used as a checklist to design a biophilia-incorporated structure. In general, these studies focus on a very similar scope, and they all work towards the same goal—of creating a closer bond between people and nature.

Fourteen Biophilic Design attributes (Ryan et al., 2014) that can be applied to the design of the built environment and landscape architecture have been developed based on the work by the pioneers of the field, starting from the work of S.R. Kellert. (see Table 1)

This research will be based on those 14 patterns of Biophilic Architecture attributes, which will be integrated with Salutogenesis and the Sense of Coherence theory.

Table 1: 14 Biophilic Attributes (*Source: Ryan et al., 2014*)

14 PATTERNS OF BIOPHILIC DESIGN
Nature in the Space
1) Visual Connection with Nature
2) Non-Visual Connection with Nature
3) Non-Rhythmic Sensory Stimuli
4) Thermal & Airflow Variability
5) Presence of Water
6) Dynamic & Diffuse Light
7) Connection with Natural Systems
Natural Analogues
8) Biomorphic Forms & Patterns
9) Material Connection with Nature
10) Complexity & Order
Natural of the space
11) Prospect
12) Refuge
13) Mystery
14) Risk/Peril

3. Method

The case study for the research is Cinnamon Care, an ECC facility located in Millanyia, Bandaragama, Sri Lanka. It is a paid facility for elders that currently provides a vast range of care activities for elders. It provides 24-hour care for elders residing in the facility, with the help of a group of well-trained caregivers. Research data inputs of 35 elders with the assistance of their caregivers who are working in the facility were utilised for this study.

For the study, a mixed-method approach will be utilised, which uses both quantitative and qualitative measures in the study. The key stakeholders would be the elders who would be residing on ECC and the caretakers who would be in charge of them. A case study consists of 6 steps that will utilise different data collection and analysis methods. (see Figure 1)

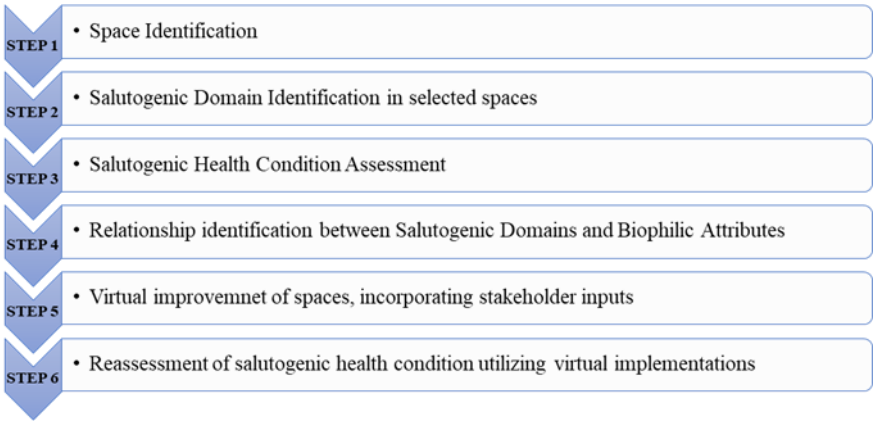


Figure 1 - Case study Framework *(Source - Author)*

3.1. SPACE IDENTIFICATION

In order to identify the most utilised spaces by elders, a data collection method of activity mapping is developed with the incorporation of caregivers' observations.

3.2. SALUTOGENIC DOMAIN IDENTIFICATION IN SELECTED SPACES

With the utilisation of a questionnaire, this step is used to identify the main salutogenic domain of the spaces identified through the activity mapping. The questionnaire inquired which of the following they felt most at each of the spaces.

- A dynamic feeling of security, confidence and control over a predictable external and internal environment - which was interpreted as Comprehensibility.
- Enhancement of adults' resources for recovery, the sense of independence and the subsequent atrophy of essential life skills - which was interpreted as Manageability.

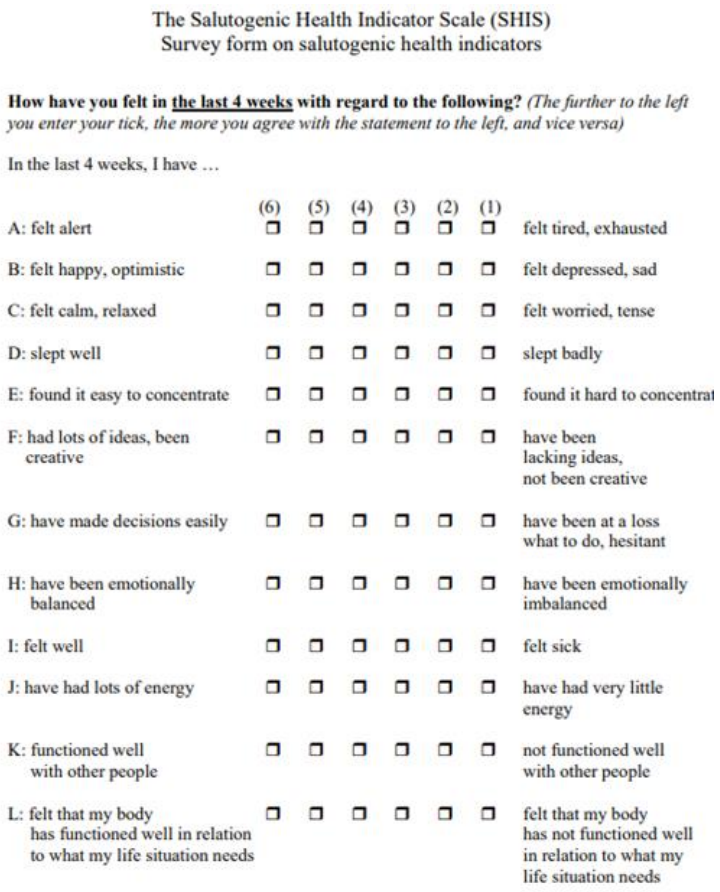
- A sense of belonging and inspires the search for human identity and respect for socio-cultural morals - which was interpreted as Meaningfulness.

3.3. EXISTING SALUTOGENIC HEALTH CONDITION ASSESSMENT

This step was conducted using a tool designated to measure the perception of salutogenic health according to a scale known as The Salutogenic Health Indicator Scale (SHIS). The questionnaire consists of twelve simple questions. It was considered higher the values, the more the presence of salutogenic well-being indicators.

3.3.1 SHIS Tool utilisation

The SHIS tool questionnaire utilised in this research has been developed by Kristianstad University of Sweden, based on psychological research related to salutogenesis (SHIS, n.d.). This tool was utilised to explore the level of salutogenesis and to identify how the main domains of salutogenesis; comprehensibility, manageability and meaningfulness were prevalent among elders. (see Figure 2)



The Salutogenic Health Indicator Scale (SHIS)
Survey form on salutogenic health indicators

How have you felt in the last 4 weeks with regard to the following? *(The further to the left you enter your tick, the more you agree with the statement to the left, and vice versa)*

In the last 4 weeks, I have …

	(6)	(5)	(4)	(3)	(2)	(1)	
A: felt alert	❒	❒	❒	❒	❒	❒	felt tired, exhausted
B: felt happy, optimistic	❒	❒	❒	❒	❒	❒	felt depressed, sad
C: felt calm, relaxed	❒	❒	❒	❒	❒	❒	felt worried, tense
D: slept well	❒	❒	❒	❒	❒	❒	slept badly
E: found it easy to concentrate	❒	❒	❒	❒	❒	❒	found it hard to concentrat
F: had lots of ideas, been creative	❒	❒	❒	❒	❒	❒	have been lacking ideas, not been creative
G: have made decisions easily	❒	❒	❒	❒	❒	❒	have been at a loss what to do, hesitant
H: have been emotionally balanced	❒	❒	❒	❒	❒	❒	have been emotionally imbalanced
I: felt well	❒	❒	❒	❒	❒	❒	felt sick
J: have had lots of energy	❒	❒	❒	❒	❒	❒	have had very little energy
K: functioned well with other people	❒	❒	❒	❒	❒	❒	not functioned well with other people
L: felt that my body has functioned well in relation to what my life situation needs	❒	❒	❒	❒	❒	❒	felt that my body has not functioned well in relation to what my life situation needs

Figure 2- SHIS Survey *(Source - SHIS, n.d.)*

For each respondent, an index value will be calculated. Each question could yield a maximum score of 6 (for a positive response) and a minimum score of 1 (for a negative response). A total index will be calculated by totalling the value for all twelve questions. This means a score range in between the maximum positive index value, total of 72 (6x12=72), and a corresponding minimum index value of 12 (1x12=12) is possible to be scored by each adult.

Through this, a score for each domain can be calculated to identify the distribution of the salutogenic indicators, by categorising the 12 indicators which were questioned through the (SHIS) Survey under the 3 main domains of Sense of Coherence, as below, based on the literature studies that were done about the 3 domains, and which collectively interrelate to Salutogenic wellbeing.

Table 2: Relationship between 12 indicators of SHIS and 3 Domains of Sense of Coherence *(Source: Author)*

A. Degree of Alertness	Manageability
B. Perception of Happiness	Meaningfulness
C. Relaxation	Meaningfulness
D. Quality of sleep	Manageability
E. Level of Concentration	Comprehensibility

F. Amount of Creativity	Comprehensibility
G. Decision-making ability	Manageability
H. Emotional balance	Meaningfulness
I. Feeling of Wellness	Meaningfulness
J. Energy Level	Manageability
K. Interaction with others	Comprehensibility
L. Body functioning	Comprehensibility

3.4. RELATIONSHIP IDENTIFICATION BETWEEN SALUTOGENIC DOMAINS AND BIOPHILIC ATTRIBUTES
This step screens out the biophilic attributes that will enhance the 3 salutogenic domain indicators in each of the selected spaces, being one of the most crucial steps of the research. The Questionnaire utilised in this step comprises the 14 Biophilic attributes identified through the systematic literature review related to biophilic architecture (see section 2.2 and Table 1). The questionnaire is useful to evaluate how the 3 main domains of Sense of Coherence, which are Comprehensibility, Manageability and Meaningfulness, could be fulfilled by the role played by 14 Biophilic Attributes.

3.5. VIRTUAL IMPROVEMENT OF SPACES INCORPORATING STAKEHOLDER INPUTS
One-on-one interviews were conducted among selected elders in order to obtain their insightful feedback on the experience of spaces and the attributes of Biophilic Architecture, which include open-ended semi-structured questions based on Biophilic Architecture Attributes. This depicts their perception and their ideas on how spaces should be designed with integration of Biophilic attributes, which is helpful to attain the research objective of incorporating stakeholders and real users of the spaces in order to develop a stakeholder-driven design framework. Based on the stakeholder inputs, obtained through one-on-one interviews that will be analysed using thematic analysis, the spaces are to be virtually improved, using three-dimensional modelling software SketchUp and rendering software Lumion.

3.6. REASSESSMENT OF SALUTOGENIC HEALTH CONDITION BASED ON VIRTUAL IMPLEMENTATIONS.
The virtual spaces developed in step 5 will prepare the basis for this step, and the exact questionnaire utilised in step 3 of the research will be reutilised in order to identify improvements of Salutogenic well-being that will take place among stakeholders and the improvements of the salutogenic domain balance within the ECC facility. This step also includes a research limitation, as the implementations will be shown to stakeholders virtually, and their well-being improvements could only be predicted by assuming they dwell in the developed spaces.

4. Results and Discussion

4.1. SPACE IDENTIFICATION
Results of the space Identification step were found through the study of activity mapping done on the premises for a period of one week, by the caretakers. The spaces that were mainly utilised by the elders were identified as: Activity area, Bedroom Area, Living Area, Garden Space, Dining Area. (see Figure 3)

Figure 3- Spaces of ECC mainly used by elders *(Source – Author)*

4.2. SALUTOGENIC DOMAIN IDENTIFICATION IN SELECTED SPACES
Results of the feedback provided by the elders for the first Questionnaire depict the relationship of Salutogenic domains for

each of the most utilised spaces of the ECC. (see Figure 4)

Figure 4- Questionnaire Survey 1 Results (*Source - Author*)

Based on the greater number of mentions of the most dominant domain by the 35 respondents and considering the representation of all 3 domains within this research, as a study limitation, the three spaces shown below were selected out of the most used spaces to proceed with the study

- Space A -Activity Area-Comprehensibility Domain
- Space B -Personal Bedroom-Manageability Domain
- Space C -Living Area-Meaningfulness Domain

4.3. EXISTING SALUTOGENIC HEALTH CONDITION ASSESSMENT

The existing salutogenic well-being conditions of elders were quantified utilising the SHIS Survey, which were categorised into the 3 salutogenic domain indicators. An individual assessment of each individual respondent out of a total maximum score of 72 was calculated. These outputs give an overall idea about the salutogenic health condition of the elders residing in the ECC. (Figure 5)

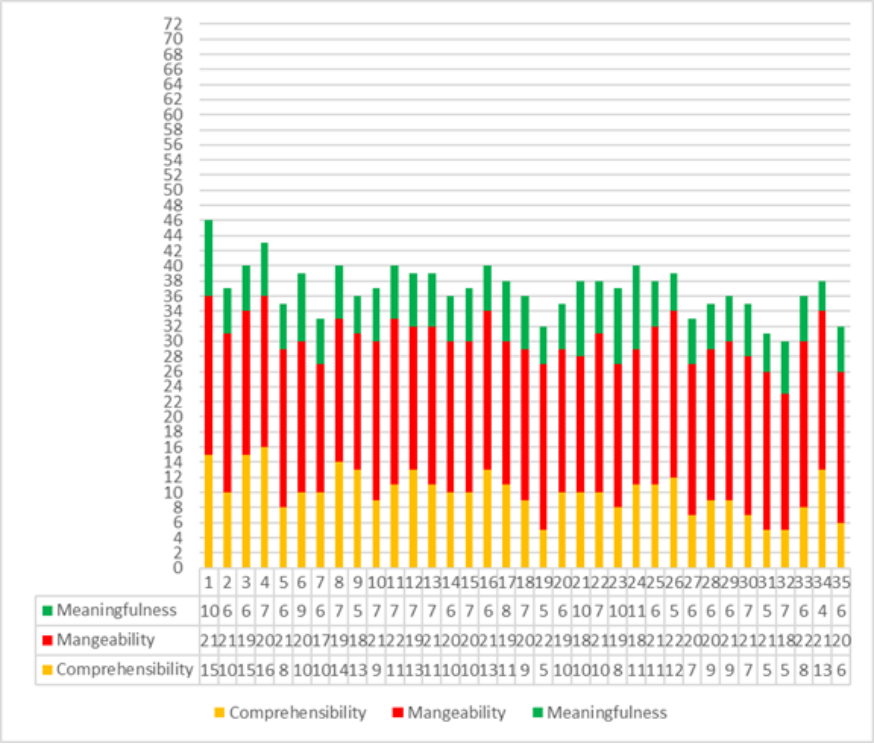


Figure 5- Scores obtained on SHIS Survey by the 35 elders based on current conditions of ECC *(Source - Author)*

The graph shows that most of the salutogenic health of elders comprises the manageability domain. Further, it can be seen that most of the elders have obtained a score surpassing the value of 36, which is mid-range of the score. This shows that most of the elders lead a life with considerable salutogenic wellbeing.

4.4. RELATIONSHIP IDENTIFICATION BETWEEN SALUTOGENIC DOMAINS AND BIOPHILIC ATTRIBUTES

With the usage of a Questionnaire comprising the 14 Biophilic attributes and their role in fulfilling the Domains of Salutogenesis in each of the 3 selected spaces of ECC, results were found for the 3 spaces in ECC. The 2 most mentioned biophilic attributes for each space would be selected to discuss in depth, altogether formulating an in-depth discussion on 6 biophilic attributes within the research and architectural implementations, based on those attributes, to enhance salutogenic well-being.

4.4.1 Space A – Activity Area

Activity Space in which the Comprehensibility domain, of Salutogenic well-being (Figure 6), played a major role, the 2 most mentioned Biophilic Attributes were;

- Visual Connection with Nature (BA 1)
- Non-Visual Connection with Nature (BA 2)

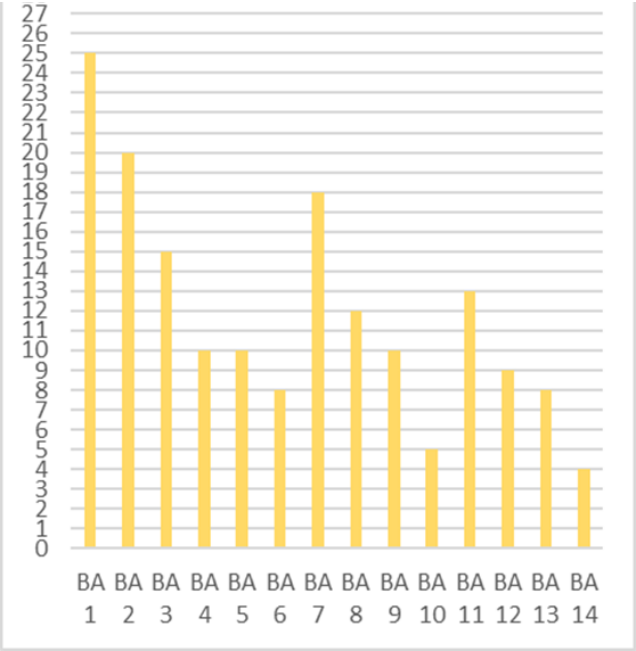


Figure 6- Biophilic Attributes impact on Comprehensibility *(Source - Author)*

Visual Connection with Nature could be determined by direct views to nature and the adaptation of windowless spaces, to accommodate and experience images sculptors related to nature. Through thematic analysis of interviews with elders and caretakers, it was found that ECC provides ample windows and viewpoints, allowing direct visual access to natural elements. Additionally, spaces incorporating nature-inspired images and sculptures were also recognised, indicating that this attribute is already identifiable and effectively implemented.

Non-visual connections with nature can be determined by auditory, olfactory, gustatory, and tactile perceptions. Elders reported that the ECC facilitates the auditory perception of nature by designing spaces that transfer sounds from the exterior to the interior. However, suggestions were made to enhance other senses, including planting vegetation with pleasant smells, incorporating fruit-bearing plants for gustatory engagement, and designing façade surfaces that mimic natural textures for tactile interaction. These results indicate partial implementation of this attribute, with opportunities for further enhancement.

4.4.2 Space B – Bedroom Area

For Bed Bedroom Space in which the Manageability domain (Figure 7), of Salutogenic well-being, played a major role, the 2 most mentioned Biophilic Attributes were;

- Thermal and Airflow variability (BA 4)
- Dynamic and Diffuse light (BA 6)

Thermal and Airflow Variability includes factors such as air temperature, relative humidity, airflow across the skin, and radiant temperature of surrounding surfaces. From the thematic interviews with elders and caretakers, it was recognised that only the design measures related to air temperature, such as façade fenestration with appropriate glazing, shading, and operable windows, were currently available. Other architectural strategies, such as the controlled use of water features to

manage humidity, openings for cross and stack ventilation, and seating areas offering different radiant temperature levels, were not identifiable.

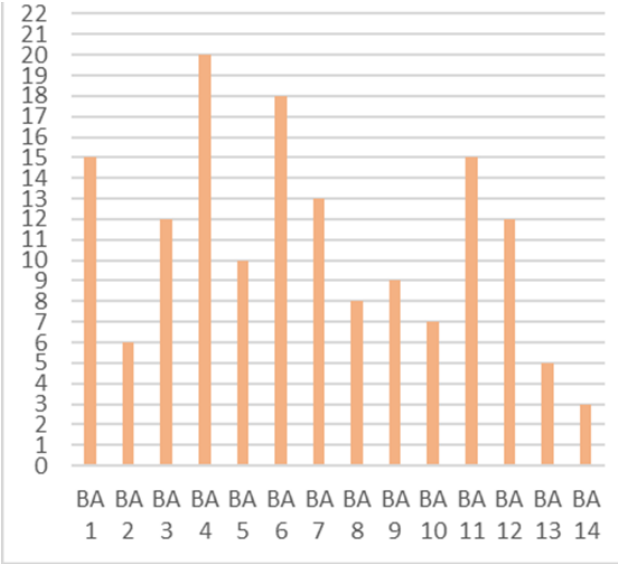


Figure 7- Biophilic Attributes impact on Manageability (*Source - Author*)

Dynamic and Diffuse Light (BA 6) is identifiable by both natural and artificial light. It was found out that natural light in the case study stimulates the eye in ways that support positive physiological responses, such as wayfinding, task completion and maintaining circadian rhythms. Similarly, artificial lighting was also recognised as fulfilling these functions. Thus, this biophilic attribute is already identifiable and effectively implemented according to the stakeholders.

4.4.3 Space C – Living Area

For Living Area Space in which the Meaningfulness domain (Figure 8), of Salutogenic well-being, played a major role, the 2 most mentioned Biophilic Attributes were;

- Prospect (BA 11)
- Presence of Water (BA 5)

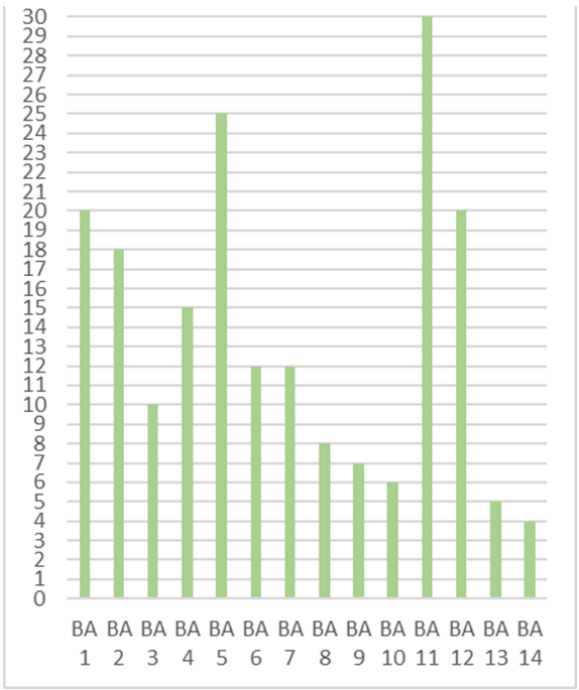


Figure 8- Biophilic Attributes impact on Meaningfulness *(Source - Author)*

The biophilic attribute Presence of Water (BA 5) can be perceived visually, auditorily, and tactilely. According to the thematic interviews, elders recognised the auditory perception of water, noting that sounds of flowing water provided a

calming and healing effect. However, the visual presence of water in green spaces and opportunities for tactile interaction were not identifiable in the case study, indicating that these aspects of the attribute remain under-implemented.

The biophilic attribute Prospect (BA 11) is determined by undisturbed views and a sense of safety. Stakeholders stated the ECC effectively provides unobstructed views of nature and includes sheltered seating areas from which they can comfortably enjoy distant vistas. Therefore, this attribute is already identifiable and well implemented according to the elders.

4.5. VIRTUAL IMPROVEMENT OF SPACES INCORPORATING STAKEHOLDER INPUTS

Based on the one-on-one interviews done with elders in the previous step, their perception of biophilic attributes was analysed in-depth, and the factors that they identified as lacking in the current ECC facility were virtually developed. As the real users of the space, as well as the daily users of the space, they had eye-opening points to highlight about the spaces they utilise, as well as practical suggestions that could enhance their salutogenic well-being based on the biophilic attributes.

4.6. REASSESSMENT OF SALUTOGENIC HEALTH CONDITION BASED ON VIRTUAL IMPLEMENTATIONS.

Figure 9- Virtual Improvements for the spaces *(Source - Author)*

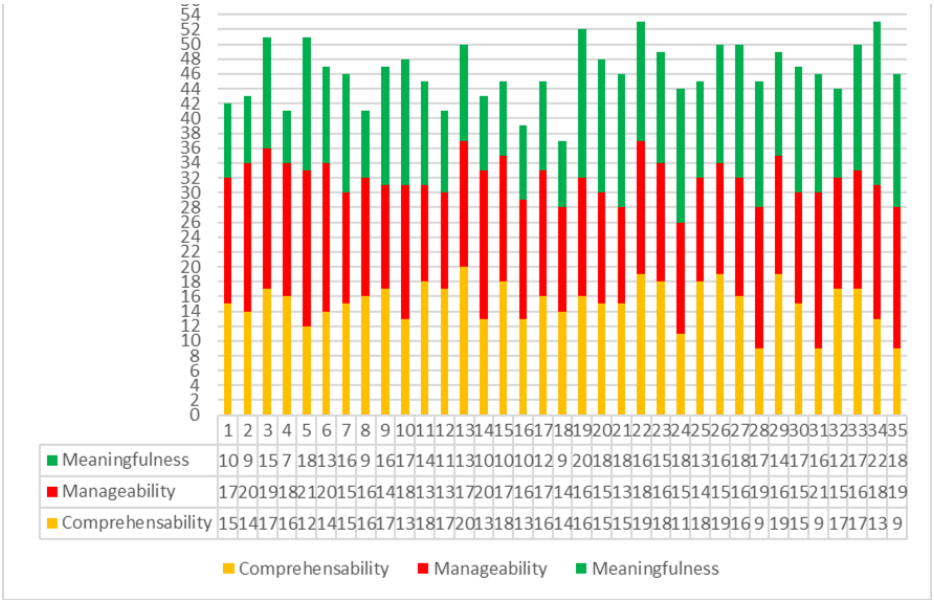


Figure 10- Comparison of SHIS survey scores of 35 elders *(Source - Author)*

Re-assessment of each score showed that there is an increase in the overall scores of all the elders, considering the virtual condition. Also, it showed an increase in all the elders' scores, related to the indicators of the Meaningfulness Domain of Salutogenic well-being. (see Figure 10)

The graph shows a comparison of the salutogenic well-being scores of the elders in the virtual condition, showing an overall increase. This is a result of the application of biophilic attributes according to the framework.

These show that systematic implementations of Biophilic Attributes on spaces could improve not only the overall salutogenic health, but also the balance in salutogenic domains perception in ECCs.

Table 3: Design Framework for future Implications *(Source: Author)*

DESIGN FRAMEWORK FOR THE FUTURE IMPLICATIONS

Salutogenic Domain	Salutogenic Indicators	Selected space	Similar spaces in an ECC of similar salutogenic domain	Biophilic Attributes	Sample Biophilic Architectural Implications
Comprehensibility	Level of Concentration Amount of Creativity Interaction with others Body functioning	Activity Area	**Common spaces with specific functions** *Ex- Dinning Area* Cognitive oriented	**Visual connection with Nature**	
				Views to nature	Provision of ample windows and viewpoints in spaces.
				Adaptation to windowless spaces	Spaces to accommodate and experience images sculptors related to nature
				Non visual connections with Nature	
				Auditory perception	Design of spaces that better transfer sounds from exterior to interior.
				Olfactory perception	Design of landscape with conscious decision on vegetation that provides a pleasant smell.
				Gustatory perception	Design of landscape with conscious decision on vegetation such as fruit bearing plants that are accessible
				Tactile perception	Design of façade surfaces that mimic textures of nature
Manageability	Degree of Alertness Quality of sleep Decision Making ability Energy Level	Bed Rooms	**Personal spaces** *Ex- Treatment area* Physiological oriented	**Thermal & Airflow Variability**	
				Air temperature	Design of façade fenestration with attention to windows such as glazing and shading as well as easily operable windows for elders
				Relative humidity	Conscious utilization of water features in design that would not create uncomfortable humidity conditions for health sensitive elders
				Airflow across the skin	Placement of openings for stack and cross ventilation in optimum ways
				Radiant temperature of surrounding surfaces	Opportunities to experience varied temperature ranges such as design seating spaces with differing levels of solar heat gain
				Dynamic & Diffused Light	
				Natural light	Natural light that 1.stimulates the eye that engenders a positive psychological /physiological response such as way finding and, completion of tasks 2.maintain circadian system functioning
				Artificial light	Artificial light that 1.stimulates the eye that engenders a positive psychological /physiological response such as way finding and, completion of tasks 2.maintain circadian system functioning
Meaningfulness	Perception of Happiness Relaxation Emotional balance Feeling of Wellness	Living Room	**Common spaces with no specific function** *Ex- Verandah* Psychological oriented	**Presence of Water**	
				Visual perception	Incorporation of water into green spaces
				Auditory perception	Perception of sounds of water that would provide a healing sensation for elders
				Tactile perception	Practical opportunities for elders to interact with water actively
				Prospect	
				Undisturbed view	Design of spaces that have unobstructed views of nature that elders could enjoy.
				Sense of safety	Presence of sheltered spaces with seating for elders to overlook the distant views

Table 3 shows a compilation of Design Implications for the future, summarising valuable inputs and ideas collected from stakeholders of the ECC facility. Especially when designing for elders, factors like ageism could hinder the opportunities of elders to actively exchange their ideas and opinions and designers have a key responsibility to avoid such situations.

5. Conclusion

Key findings of a six-step process that utilised mixed method approaches along with inputs of both elders and caretakers as stakeholders of the Cinnamon Care ECC facility revealed;

- Visual Connection with Nature and Non-Visual Connection with Nature as Biophilic elements have the potential to increase the Comprehensibility domain of Salutogenic wellbeing, especially in common spaces with a focused function in ECCs, which are oriented towards cognitive contentment of elders.
- Thermal and Airflow variability and Dynamic and Diffuse light as Biophilic elements have the potential to increase the Manageability domain of Salutogenic wellbeing, especially in personal spaces in ECCs which are oriented towards physiological contentment of elders.
- Prospect and Presence of Water as Biophilic elements have the potential to increase the Meaningfulness domain of Salutogenic wellbeing, especially in common spaces with a relaxation focus in ECCs, which are oriented towards psychological contentment of elders
- Systematic implementations of Biophilic Attributes on spaces could improve not only the overall salutogenic health, but also the balance in salutogenic domains perception in ECCs
- Consideration of the stakeholder input in the design and improvements of ECC facilities could play an important role in making such facilities more resilient and inclusive spaces

Salutogenic well-being, as an aspect related health and well-being of people and concepts related to it, such as sense of coherence and salutogenic domains like comprehensibility, manageability and meaningfulness, could be useful for design benchmarks in shaping ECC facilities as a building typology, which is anticipated to be increasingly in demand in the decade ahead. Biophilic Architecture, from wide research, which has already been proven to have its own impacts on healing quality in spaces and in designing spaces, was looked upon as the mediator role, in this research, for attaining this Salutogenic well-being in ECC facilities.

The Built Environment has a significant impact on the lives of people because it is the sensitive container in which people live out their lives. Especially when it comes to elders, who might be spending a greater part of the latter stages of life in a single built environment entity, and therefore, care would have to be given in consideration of their challenging conditions. Designers of such facilities should be empathetic enough to provide their fullest contribution, making those places resilient and habitable.

6. References

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