

Theoretical Framework of Green and Blue Spaces Towards Enhancing Well-being for Individuals with Hoarding Disorder

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ABSTRACT

Hoarding disorder (HD) presents a unique set of challenges that call for novel therapeutic approaches. These approaches incorporate both psychological and environmental aspects, particularly with regard to the planning of green and blue spaces. The concept of green and blue spaces presents a significant opportunity in specific exploration for individuals who are struggling with HD. The aim of this study is to establish the ideation of environments that are conducive to the enhancement of therapeutic interventions, promotion of emotional recovery, and the encouragement of behavioural changes in individuals with HD. By drawing inspiration from the principles of biophilic design and attachment theory, this approach successfully combines natural elements, sensory engagement, and restorative architectural interventions in a harmonious blend. This research employs a two-stage methodology, which consists of conducting site-specific analyses of low-cost housing locations in Kuala Lumpur (PPR Beringin and PPR Desa Tun Razak) through field surveys, observations, and a review of the previously published literature. Attachment theory, cognitive behavioural therapy, and the principles of biophilic design are brought together to develop a theoretical framework. The results

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show the theoretical incorporation of green and blue spaces into residential settings explores the possibilities to improve psychological well-being. The capacity of the spaces to serve as potential restorative architectural design is brought to light by incorporating concepts from the fields of psychology, architecture, and nature. Future research recommends investigations on both the long-term effects of these therapeutic spaces

INTRODUCTION

The problem of hoarding behaviour presents a significant challenge in Malaysia's affordable housing settings, particularly in densely populated areas such as low-cost homes and flats. The elevated prevalence of the disease among populations not only gives rise to concerns regarding individuals' welfare but also poses broader societal and environmental challenges. Zartaloudi et al. (2019) suggest that Hoarding Disorder (HD) may cause the development of different illnesses, primarily due to the unsanitary conditions resulting from the excessive accumulation of items considered useless or of little value, which are not disposed of properly. Consequently, people suffering from the disease, along with their immediate surroundings, may encounter substantial health and safety issues due to the buildup of different items, which could potentially contain dangerous substances and waste.

HD is a psychiatric condition characterised by persistent difficulties in managing and organising possessions. People with HD experience significant challenges, primarily characterised by a fundamental inability to get rid of possessions, leading to excessive clutter and impaired functioning in various areas of life. They also engage in excessive acquisition behaviours, such as buying, stealing, or obtaining items without paying for them (Mathes et al., 2020). Hombali et al. (2019) state that problematic behaviour can pose a significant public health issue, as well as have detrimental emotional, physical, social, financial, and legal consequences for both the individual with the disorder and their family members.

HD was formerly categorised as a manifestation of obsessive-compulsive disorder (OCD), but it was officially acknowledged as a distinct mental illness in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) (Nakao & Kanba, 2019). Gardiner et al. (2022) state that hoarding disorder, as defined in DSM-5, is characterised by a chronic inability to discard possessions due to a perceived need to protect them, regardless of their actual worth. According to Subramaniam et al. (2020), individuals with HD may exhibit strong emotional attachment to possessions and a strong resistance to parting with them, even if it jeopardises their well-being. The DSM-5's distinctive characterisation of HD underscores the intricate nature of the condition and emphasises the necessity for targeted research and interventions to tackle its diverse impacts on both individuals and society at large.

Cognitive-Behavioural Therapy (CBT) has been the established treatment for HD since the early 1990s and has demonstrated efficacy in decreasing the severity of symptoms. However, it is worth noting that only around one-third (1/3) of individuals with HD experience clinically meaningful improvements with this approach (Yee, 2021). In addition, Chou & DuFrene (2021) noted that Compassion Focused Therapy (CFT) is a specialised treatment approach designed specifically for HD. CFT acknowledges that individuals exhibiting hoarding behaviours frequently endure profound shame, self-judgment, and challenges in cultivating self-compassion, all of which can perpetuate the persistence of hoarding symptoms. As research and clinical practice advance, it is essential to have a comprehensive understanding of the disorder and to explore various strategies in order to improve the overall effectiveness of interventions for individuals with HD.

In recent years, there has been growing attention towards the potential therapeutic advantages of green and blue environments for individuals with HD. In their study, Toliu & Huwae (2022) propose the adoption of a therapeutic design strategy that leverages the architectural elements of the building to facilitate the rehabilitation and recovery of residents. Implementing this approach is a means to achieve a restorative architectural design. The approach recognises the deep connection between mental well-being and the physical surroundings. The main objective is to create spaces that prioritise ideal conditions, with a focus on design elements that improve mental health, promote well-being, and contribute to a harmonious environment.

Social Alienation

Individuals afflicted with HD often experience a sense of disconnection from their support networks and communities, leading to a profound issue of social alienation with far-reaching consequences (Kjoelaas et al., 2022). HD is defined by the excessive accumulation of possessions and a difficulty in getting rid of them. This condition presents significant difficulties for individuals affected by it, as well as their families and society in general (Zartaloudi et al., 2019). Paskaleva-Yankova (2022) asserts that social alienation intensifies sensations of loneliness, isolation, and disconnection from meaningful social interactions and support networks, thereby exerting a substantial adverse impact on depression. Hoarding is strongly associated with problems in participating in social activities, decreased social assistance, increased isolation, and difficulties in maintaining healthy family dynamics (Davidson et al., 2020). Hence, HD is a profound psychological battle that impacts all aspects of an individual's existence, encompassing their mental and physical well-being, social interactions, and overall satisfaction with life.

Unsanitary

Davidson et al. (2020) have reported that the existence of clutter within living spaces leads to notable impairment, including adverse effects on health and safety, as well as financial difficulties. Individuals with HD may experience feelings of embarrassment regarding their living conditions, which can hinder their ability to form and maintain interpersonal relationships. As a result, they often have a tendency to avoid social interactions. Mathes et al. (2020) contend that the widespread occurrence of HD underscores its broad implications. The excessive accumulation of possessions not only obstructs the functionality of living spaces but also poses significant risks to both physical and psychological well-being. This leads to unsanitary conditions and hampers adequate ventilation, thereby promoting the proliferation of harmful pathogens such as mould and mildew. People with HD often experience a high rate of comorbidity, frequently encountering simultaneous mental health conditions such as anxiety, depression, attention-deficit/hyperactivity disorder (ADHD), and various personality disorders (Sivakanthan et al., 2021). HD has a negative impact on the architecture of a space. It hinders the functionality of the space by blocking pathways and emergency access. Additionally, it diminishes the visual appeal of a building by overshadowing its design features. Architecturally addressing HD necessitates careful consideration of its immediate health and safety ramifications, as well as its enduring impact on the structure, functionality, and aesthetics. Implementing design strategies that prioritise flexibility, adaptability, and easy maintenance can effectively mitigate these effects, guaranteeing that buildings remain secure, functional, and aesthetically pleasing.



Fig. 1. PPR Desa Tun Razak

Source: The Star, 2022

Growth Tendencies

Engaging in item collection can yield notable spiritual and mental advantages, and it should be distinguished from hoarding tendencies. The act of finalising a collection parallels the developmental journey of a child, commencing with basic objects and progressively advancing towards the acquisition of more valuable and significant belongings (Allahdini et al., 2017). As stated by Roane et al. (2017), HD in older individuals typically starts prior to the age of 40 and progressively deteriorates as they reach middle age. Furthermore, the aforementioned studies revealed that depression is prevalent in 14% to 54% of elderly individuals with hoarding tendencies, suggesting a notable correlation between hoarding behaviour and symptoms of depression.

Aim & Objectives

The research aims to develop a theoretical framework in addressing HD by the integration of green and blue spaces. Following the aim are the set of research objectives that contribute towards developing the framework:

- i) To identify the real issue surrounding the HD from psychological theory
- ii) To conduct site observation to correlate the theory with the existing built environment
- iii) To provide comparative analysis towards developing the theoretical framework

LITERATURE REVIEW

Attachment Theory

Attachment theory, initially conceptualised by John Bowlby (1958), has served as a prominent framework for comprehending the emotional and relational growth of humans. Mathes et al. (2020) have highlighted that attachment theory, which is mainly focused on early caregiver-child relationships, has attracted interest due to its potential applicability in comprehending HD. Attachment theory highlights the importance of early attachment experiences with carers in influencing an individual's emotional regulation and interpersonal relationships (Delgado et al., 2022). Consequently, individuals with HD will have encountered disturbances or uncertainties in their early bonds, leading to challenges in regulating emotions and establishing positive relationships.

Kehoe & Egan (2019) state that individuals with HD may develop strong emotional connections to their belongings, perceiving them as an extension of their own identity or as a source of solace. According to Van Roessel et al. (2023), their study revealed that a tendency towards acquisitiveness can predict object attachment. This suggests that differences in how people form attachments to objects may be linked to both the desire to save possessions and the behaviour of acquiring in hoarding disorder.

Attachment theory applied to architectural settings offers innovative concepts for designing compassionate, functional, and supportive environments for individuals experiencing HD. Seamon & Mugerauer (2015) and Davis & Clark (2019) argue that architectural strategies aim to create flexible spaces that can foster emotional connections, incorporate sensory experiences, promote spatial independence, and cultivate therapeutic environments. These strategies are designed to alleviate distress, enhance organisation, and improve overall well-being.

Architectural design that integrates attachment theory offers a comprehensive comprehension of how early emotional attachments impact behaviours and interactions with surroundings and objects, particularly for individuals with HD. Architects and designers can enhance emotional regulation and interpersonal relationships by considering people's emotional attachment to their possessions. This can be achieved by designing built environments that foster a strong sense of belonging through placemaking, and by redirecting attachment towards the community and the place, rather than material possessions.

Biophilic Design Theory

The term "biophilia", coined by social psychologist Erich Fromm in 1964, refers to the innate affinity or attraction towards life. The biophilic theory offers a comprehensive understanding of the healing and structural implications of human-nature connection, well-being, and environmental design in the context of HD (Smith et al., 2019). According to Zhong et al. (2022), the ideas of 'nature' and biophilic design have received considerable focus in the field of architecture, especially as a reaction to the increasing environmental challenges that society confronts.

In order to better understand biophilic design, it presents an opportunity to discover simple ways of utilising natural elements in the environment and transforming them into effective biophilic designs. These designs have the potential to positively impact an individual's health and overall well-being (Hady, 2021). Cooley et al. (2020) found that spending time in natural outdoor environments has positive effects on both the body and mind. These benefits include reduced stress responses and improved mood. Architectural implications encompass the integration of biophilic design elements, such as the utilisation of organic materials, the establishment of verdant areas, the incorporation of aquatic features, and the implementation of daylighting techniques. These elements are designed to improve emotional well-being, stimulate the actual senses, and support environmental sustainability.

The establishment of environments that promote mental well-being, reduce stress levels, and enhance overall quality of life enables individuals to establish a connection with nature and integrate natural elements. This aligns with the objective of examining how a theoretical framework can advance restorative architectural practices in order to improve the well-being of HD patients.

Green and Blue Spaces

Green and blue spaces have become increasingly important in academic discourse, particularly in the domains of environmental science, public health, urban planning, psychology, and landscape architecture. McCartan et al. (2023) assert that mental health problems are a significant public health concern, and the therapeutic benefits of nature are increasingly recognised as a means to attain psychological well-being.

According to McCartan et al. (2023), areas with natural vegetation such as woodlands, forests, open countryside, or city landscaping like parklands, city trees, gardens, or allotments are commonly known as "green spaces" in both urban and rural environments. The term "blue spaces" encompasses man-made urban waterways, canals, or ponds that are connected to natural bodies of water such as lakes, rivers, or coastal areas. The influence of green and blue spaces on health can be classified into three (3) main biopsychosocial pathways: mitigation of harm (capturing and restricting air pollution, noise, and heat), restoration of capabilities (improving attention and reducing stress), and development of capacities (encouraging physical activity and social cohesion) (Geneshka et al., 2021).

Table 1. Overview of the green space typologies and characteristics

Green Space Category	Description	Examples
Urban green space	Urban land covered by vegetation, which does not fall (solely) into one of the other categories such as parks or gardens	Urban forest, street trees, green vegetation cover in the city, informal green spaces
Park	A large area of land with grass and trees, usually surrounded by fences or walls, and specially arranged so that people can walk in it for pleasure	Urban park, district park, neighbourhood park
Garden	An area where plants and flowers are cultivated; this can be either a private garden (adjacent to the house) or a public garden	Backyard, botanical garden
Forest and woodland	An area mainly covered with trees and undergrowth cover	Deciduous, coniferous, mixed forest
Grassland and meadows	An area mainly covered with grass	Mowed land, improved grassland (used for grazing), semi-natural grassland
Trees and other plants	Plants, shrubs or vegetation cover	Tree canopy cover, vegetation cover, shrubs
Biodiversity	Diversity in plants and animals	Flora richness, fauna richness

Source: Green and Blue Spaces and Mental Health: New Evidence and Perspective for Action (2021)

Table 2. Overview of blue space typologies and characteristics

Green Space Category	Description	Examples
Coast	The part of the land directly adjacent to the sea	Rocky coast, sandy coast
Inland water	Aquatic environments located within land boundaries	River, lake, canal, ponds, fountain
Marine	Aquatic environments located within the sea	Coral reef

Source: Green and Blue Spaces and Mental Health: New Evidence and Perspective for Action (2021)

According to Dadvand & Nieuwenhuijsen (2021), green spaces in urban environments are not merely decorative, but rather crucial elements that significantly influence human health and well-being. According to their findings, green spaces play a vital role in mitigating stress, enhancing mental well-being, augmenting cognitive functions, and improving the overall quality of life for urban dwellers. Dadvand & Nieuwenhuijsen (2021) concurred that green and blue spaces function as therapeutic settings that alleviate the daily stresses of urban living, providing opportunities for relaxation, recreation, contemplation, and social interaction through effective placemaking.

Simultaneously, incorporating green and blue spaces can contribute to the development of settings that foster emotional regulation, reduce stress levels, and enhance individuals' overall well-being. Establishing an environment that promotes healing, durability, and assistance can be accomplished by implementing a comprehensive structure that integrates attachment theory, biophilic design, and deliberate utilisation of

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green and blue spaces. This comprehensive approach emphasises the various situations in which architectural and environmental design can play a vital role in improving mental health and promoting the restoration of well-being.

RESEARCH METHODOLOGY

The research on HD in Kuala Lumpur's affordable housing consists of two (2) distinct phases: site-specific analysis and the creation of a theoretical framework. The initial stage is dedicated to identifying and resolving specific challenges encountered at two (2) locations: PPR Desa Tun Razak and PPR Beringin, comprising six (6) blocks and a total of 1,896 apartments, exemplify the densely populated living arrangements commonly found in affordable housing. PPR Desa Tun Razak, established in 1999, faces challenges related to insufficient parking facilities, which hampers movement within the towers. The data gathering methods used in this study include field observations and a review of current research literature to thoroughly examine the types and characteristics of green and blue spaces in various regions.

The second step involves constructing a theoretical framework by examining relevant literature to identify key elements of HD, as well as the impact of green and blue spaces on well-being. The incorporation of attachment theory, biophilic design, and the significance of green and blue spaces contributes to the establishment of a coherent framework that aligns with the objectives of the study. To fully understand the broader implications of hoarding behaviour in similar low-cost housing settings and to guide the development of both theoretical and practical approaches to improve these environments.

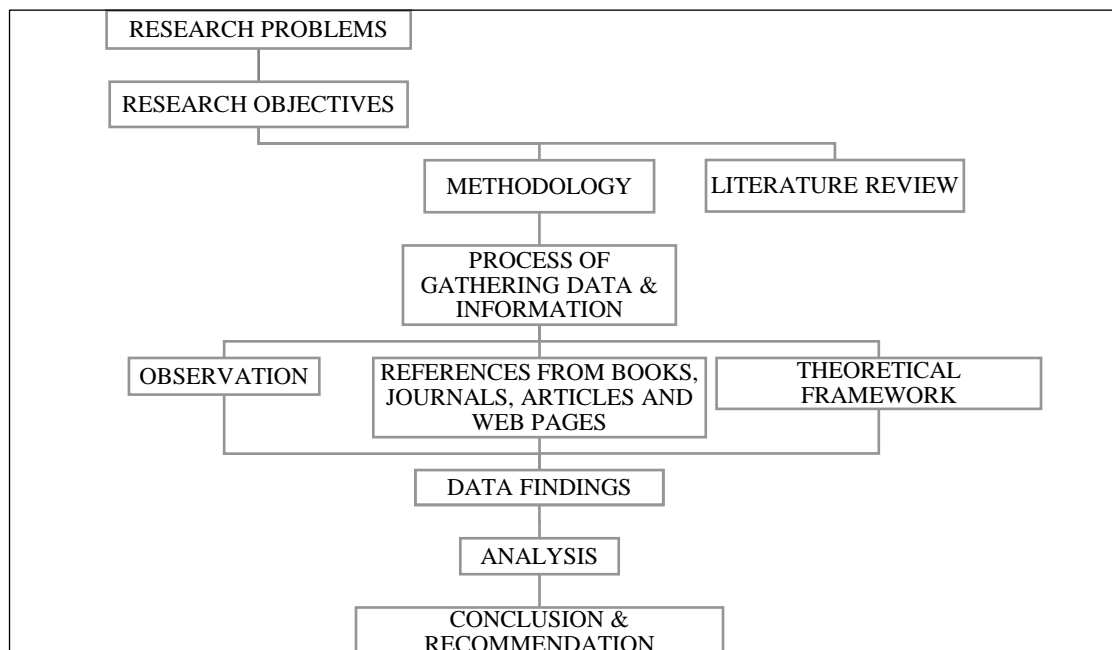


Fig. 2. Research Methodology Flowchart

Source: Authors (2023)

RESULTS AND FINDINGS

The findings and discussion of this research are divided into two (2) analyses. First are the findings analysis of the site issues located at Program Perumahan Rakyat (PPR) Beringin and Program Perumahan Rakyat (PPR) Desa Tun Razak, and second are the findings from comparative analysis between literature review and site observation.

Analysis of Program Perumahan Rakyat (PPR) Beringin, Kuala Lumpur

The open and green spaces within this PPR community area are significantly limited and condensed, mainly because of the complicated arrangement of the units and the high population density. The insufficient provision of green areas in this area limits residents' ability to fully appreciate and interact with their existing natural surroundings. Fig. 3 shows a satellite view of PPR Beringin, encompassing the building arrangement, the surrounding green space and the neighbouring surroundings.



Fig. 3. Aerial view of PPR Beringin

Source: Google Earth (2023)

The red-coloured demarcation defines the perimeter of the PPR Beringin, while the green colour indicates the location of the open spaces within the housing complex. This housing community is located in close proximity to the Sungai Batu. However, due to private land ownership, the riverfront has been enclosed by a gate, prohibiting the public from accessing and utilising the riverfront. Fig. 4 shows the lack of maintenance and small development of open space. The tree's shade is restricted solely to the pedestrian walkway.



Fig. 4. Open Space at PPR Beringin

Source: Authors (2024)

Fig. 5 shows another open green area situated within PPR Beringin. This area offers plenty of space for the community and is adorned with a few large trees providing shade. The park utilises natural turfing, enabling people to directly step onto the ground. This demonstrates the claim by Hady (2021) and Coolet et al., (2020) that this restorative architectural treatment is beneficial in eliminating any detrimental ailments from the body by providing accessibility to green spaces within built environment.



Fig. 5. Green Space at PPR Beringin

Source: Authors (2024)

Fig. 6 shows the restricted access leading to the water elements at Sungai Batu. The big community of PPR Beringin is unable to derive any advantages from the riverbank. Given the presence of private property ownership, it is possible that the mentioned region will undergo future development, hampering the opportunity to actually engage with the existing water body.



Fig. 6. Gated Boundary at Sungai Batu

Source: Authors (2024)

In conclusion, the PPR Beringin community in Kuala Lumpur faces a deficiency in green and blue spaces due to top limitations in land size and boundaries. Nonetheless, the government's initiative in establishing the "Program Perumahan Rakyat" meets the basic requirements for providing open spaces, allowing residents to engage in regular activities within the area. By enhancing genuine green and blue spaces, there is potential to alleviate community tensions and foster restorative architectural intervention towards a more well-being environment.

Table 3. Analysis Table on PPR Beringin, Kuala Lumpur

	Green Space	Blue Space
Space Category	<ul style="list-style-type: none"> i) Urban green space: Urban open space land has been covered by vegetation ii) Park: A large area of land with trees and plants and especially for people or community well-being 	<ul style="list-style-type: none"> i) Inland water: Water elements located at land boundaries
Example on site	<ul style="list-style-type: none"> i) Turfing ii) Lush tree around park iii) Children playground 	<ul style="list-style-type: none"> i) River ii) Lake

Source: Authors (2024)

Analysis of Program Perumahan Rakyat (PPR) Desa Tun Razak, Kuala Lumpur

In order to resolve this problem, the PBT from Dewan Bandaraya Kuala Lumpur (DBKL) decided to build a podium parking facility in the centre courtyard, encircled by all the residential units. Nevertheless, the use of the centre courtyard has undermined the amount of open space, greatly restricting possibilities for communal activity. As a result, the remaining available area is mainly occupied by a small children's playground. Fig.7 shows an aerial perspective of the PPR Desa Tun Razak, encompassing the building arrangement and the neighbouring surroundings.



Fig. 7. Aerial View PPR Desa Tun Razak

Source: Google Earth (2023)

The first open space at PPR Desa Tun Razak is depicted in Fig. 8, where outdoor activity courts, a playground and green turf are featured. Initially, there was a bigger open space in the neighbourhood with unobstructed views of the outside, which promoted a sense of community and provided a nice environment. However, this green area is developed into building the podium parking complex in response to worries about availability of parking spaces. This project's main goal is to facilitate better traffic flow and reduce parking issues. As result, the community's ability to engage in outdoor activities is now restricted due to a lack of accessible green spaces, causing possible detrimental impact on the well-being of the local population by the loss of open space. According to research, having access to green spaces is essential for both mental and physical health since it encourages social connection and outdoor activities (Dadvand & Nieuwenhujisen, 2021). Residents are more likely to spend more time indoors when there are not enough green spaces, which can worsen feelings of stress.



Fig. 8. Before Construction of Podium Parking

Source: Google Earth (2021)



Fig. 9. After Construction of Podium Parking

Source: Google Earth (2021)



Fig. 10. Effect Podium Parking to Existing Green Space

Source: Authors (2024)

The PPR Desa Tun Razak community in Kuala Lumpur is experiencing a shortage of green space due to an excessive number of vehicles from the community, which has necessitated the construction of a podium parking by the local authority. It is the community's responsibility to take care of green space as it is an essential component of the environment. In reference to the biophilic design theory, the presence of open space can positively impact mental health by providing fresh oxygen and promoting a sense of peace.

Table 4. Analysis Table on PPR Desa Tun Razak, Kuala Lumpur

	Green Space	Blue Space
Space Category	i) Urban green space: Urban open space land has been covered by vegetation ii) Park: A large area of land with trees and plants and especially for people or community well-being	i) Inland water: Water elements located at land boundaries
Example on site	i) Turfing ii) Lush tree around park	N/A

Source: Authors (2024)

Comparative Analysis of Site Observation and Literature Review

Analysing the literature study offers a thorough comprehension of the existing knowledge about the use of green and blue spaces in treating HD problems, specifically in urban environments. Multiple studies highlight the therapeutic advantages of natural habitats, highlighting their capacity to reduce stress, improve mental well-being and foster general health. The book "Green and Blue Spaces and Mental Health: New Evidence and Perspective for Action (2021)" provides a comprehensive overview of the many types and features of green and blue spaces that can be taken into consideration. Individuals with mental health can be treated by utilising this factor to promote tranquilly, relaxation and mindfulness. The literature findings

are systematically tabulated to illustrate the integration of green and blue spaces. All the various forms and qualities will be in accordance with the specific problem of low-cost housing in the Klang Valley. Based on it, it can be ascertained whether the green and blue spaces of PPR Beringin and PPR Desa Tun Razak are valid or not.

Table 5. Table of Consideration as Green Spaces in PPR

	PPR Beringin, Kuala Lumpur	PPR Desa Tun Razak, Kuala Lumpur
Green Space Category	i) Urban green space: Urban open space land has been covered by vegetation ii) Park: A large area of land with trees and plants and especially for people or community well-being	i) Urban green space: Urban open space land has been covered by vegetation ii) Park: A large area of land with trees and plants and especially for people or community well-being
Example on site	i) Turfing ii) Lush tree around park iii) Children playground	i) Turfing ii) Lush tree around park
Consideration as Green Spaces	YES	N/A

Source: Authors (2024)

Table 6. Table of Consideration as Blue Spaces in PPR

	PPR Beringin, Kuala Lumpur	PPR Desa Tun Razak, Kuala Lumpur
Blue Space Category	i) Inland water: Water elements located at land boundaries	i) Inland water: Water elements located at land boundaries
Example on site	i) River ii) Lake	N/A
Consideration as Green Spaces	YES	N/A

Source: Authors (2024)

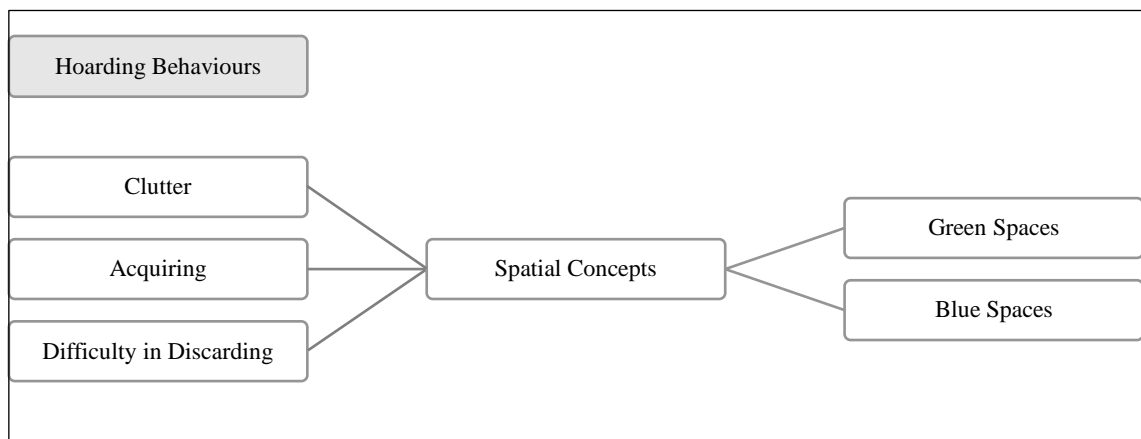


Fig. 11. Hoarding Behaviours

Source: Authors (2024)

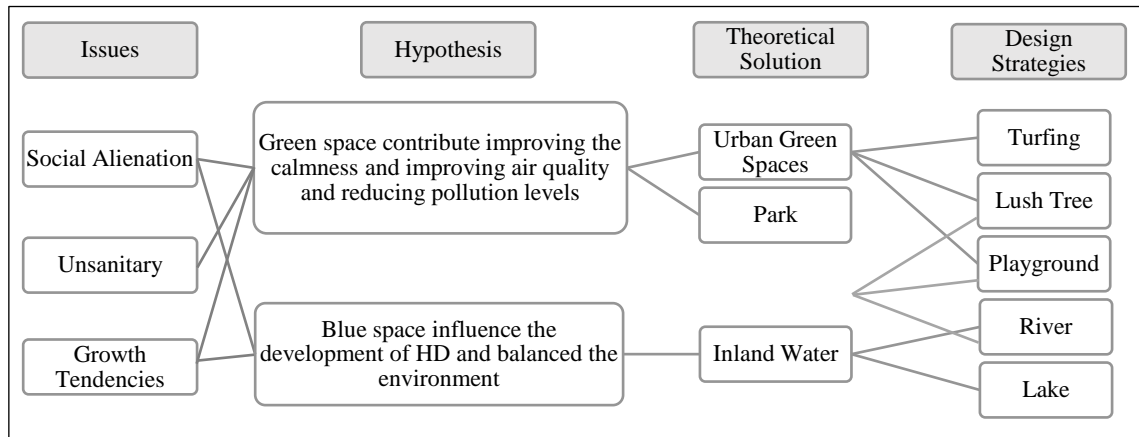


Fig. 12. Theoretical Framework

Source: Authors (2024)

DISCUSSION

The correlation between hoarding behaviours, clutter, acquiring tendencies, and difficulty discarding possessions is intricate and diverse. HD frequently originates from underlying psychological factors, such as anxiety, attachment challenges, and perfectionism. These individuals may experience challenges with excessive hoarding, difficulty in arranging things, and a strong dislike for getting rid of possessions. This can result in living spaces that are cluttered and a reduced ability to function effectively.

Incorporating blue and green spaces into urban settings can provide potential remedies for addressing the difficulties linked to HD. The proposition that green spaces enhance tranquilly, air quality, and diminish pollution levels is consistent with the biophilic design theory advanced by Erich Fromm in 1964, corroborated by Smith et al. (2019) and Zhong et al. (2022), which suggests that exposure to natural environments can have a beneficial effect on mental well-being. Studies conducted by Seamon & Mugerauer (2015), and Davis & Clark (2019) have demonstrated that spending time in natural environments can effectively alleviate stress, anxiety, and depression, offering individuals a feeling of calmness and relaxation. Cities can provide individuals affected by HD with therapeutic activities and a connection to nature by integrating urban green spaces, parks, and inland water bodies into the built environment. These spaces can function as havens for individuals seeking relief from the excessive disarray of their living spaces, fostering cognitive clarity and emotional welfare.

Similarly, the existence of blue spaces, such as lakes, rivers, and oceans, can also help alleviate hoarding tendencies and promote a harmonious environment. Blue spaces provide visual appeal and leisure activities, which can assist individuals in diverting their attention from excessive acquisition and accumulation of belongings. Moreover, the soothing influence of bodies of water can potentially alleviate feelings of distress and agitation often linked to hoarding disorder, offering a sense of serenity and tranquilly.

By strategically incorporating blue and green spaces into urban areas, individuals with HD can have opportunities to participate in outdoor activities, interact with others, and access support services. Creating inclusive and accessible green and blue spaces that accommodate a range of needs and preferences can help individuals with HD feel accepted and assisted in their communities. Furthermore, incorporating nature-

based elements into architectural designs, such as indoor gardens, green roofs, and water features, can foster a feeling of affinity with the environment and foster the adoption of healthy lifestyle practices.

CONCLUSION

In conclusion, the incorporation of green and blue spaces has the potential to serve as the primary approach in enhancing the overall well-being to tackle the difficulties linked to hoarding disorder through restorative architectural intervention. These meticulously arranged and clutter-free areas are not only aesthetically pleasing but also foster a sense of order and serenity, which can be particularly beneficial for individuals prone to hoarding. Cities can enhance the quality of life and well-being of individuals affected by HD by providing opportunities for them to connect with nature, facilitating access to therapeutic natural environments, promoting a sense of control, and reducing feelings of isolation and being overwhelmed through meaningful activities.

The efficacy and proficient implementation of green and blue spaces as therapeutic interventions depend on the collective endeavours of various disciplines, collaborative cooperation, and a sustained commitment to establishing environments that prioritise wellness, inclusiveness, and resilience. By implementing a comprehensive approach and integrating diverse therapeutic techniques, all stakeholders can effectively collaborate to establish nurturing, therapeutic, and empowering settings for individuals diagnosed with HD. Further research could delve deeper into the tangible outcomes preceding and following restorative architectural interventions, examining both the enduring impacts of these healing environments and their broader implementation across various residential and cultural contexts.

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CONFLICT OF INTEREST STATEMENT

All the authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests with the funders.

AUTHOR'S CONTRIBUTIONS

Wan Mohammad Zaiem conducted the data collection, data analysis and overall writing. Azlan Ariff contributed to refining the finalised writing and Muhammad Firdaus assisted in final editing for journal submission. Nor Alisya Afifi contributed the input from psychological study and Nor Zawani is an international collaborator.

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