

# DESIGN OF MENTAL HEALTH CENTER WITH BIOPHILIC ARCHITECTURE APPROACH IN MEDAN CITY

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## ABSTRACT

*Indonesia is one of the countries that will enter the era of demographic bonus. The demographic bonus is that the productive age population's growth is more significant than the structure of the unproductive age population. Meanwhile, Indonesia is still experiencing difficulties in one of the health problems often experienced by adolescents, namely mental health. Medan is the capital city of North Sumatra Province, which has the 8th largest depression sufferer. A design approach that can answer this question is biophilic design. Biophilic design is a design approach based on biophilia, which is intended to create a space that can improve the well-being of human life physically and mentally by approaching the positive relationship between humans and nature. The Mental Health Center design method uses qualitative research methods, which will go through several processes that aim to identify the biophilic design and compare it to the interior design facility standards.*

**Keywords:** *Demographic Bonus, Mental Health Facility, Biophilic Design*

## INTRODUCTION

Indonesia is one of the countries that will enter the era of demographic bonus. The demographic bonus is the growth in the structure of the productive age population (15-64 years) is greater than the non-productive age population (under five years and over 64 years) [1]. Indonesia has entered the Demographic Bonus period since 2015 and will reach its peak in 2020-2030 and will gradually leave the Demographic bonus in 2035 [2].

The demographic bonus phenomenon can be an advantage (Demographic Dividend) that must be appropriately utilised because the demographic bonus is an infrequent opportunity and may only happen once [3]. If a country is not prepared to face this event, then the demographic bonus can become a demographic disaster (Demographic Disaster) if human resources are not of good quality [4].

According to UNFPA (United Nations Population Fund) in 2016, a country is said to enjoy a demographic bonus if everyone can enjoy good health, quality educational facilities, decent jobs, and independence for young people.

Meanwhile, Indonesia is still experiencing difficulties in one of the health problems often experienced by adolescents, namely mental health [5]. Mental health or mental health is an aspect that must be considered to create overall health. Mental health is also essential, like physical health [6].

Mental health is the most fundamental aspect of health. Good mental health affects people to be aware of their potential, handle the stresses of life, work productively, and contribute actively to society [7].

The estimated number of people with mental disorders worldwide is around 450 million, including schizophrenia [8]. Globally, according to the IHME (Institute for Health Metrics and Evaluation), in 2017, the percentage of mental disorders was 14.4%, while it was 13.5% for Southeast Asia. Meanwhile, specifically for the state of Indonesia, people with mental illnesses are 13.4%. The prevalence of mental-emotional disorders such as anxiety disorders and depression is 6.1% of the adult population, and the prevalence of schizophrenia/psychosis mental disorders is 6.7% [9]. From these data, Indonesia has experienced an increase in the

majority of households with ODGJ. There was an increase in the number to 7 per mile of households. This means that per 1000 households, there are seven households with ODGJ, so the number is estimated to be around 450 thousand severe ODGJ.

The city of Medan is the capital city of North Sumatra Province and also the third-largest city in Indonesia [10], which has the 8th largest depression sufferer, namely, 7.9%, schizophrenia/psychosis mental disorder 6.3% [9]. as a place to prevent and reduce mental disorders, namely the "Mental Health Center". This can be realised in an architectural form that can psychologically affect the city's people. Therefore, you must pay attention to every architectural element that will be used. The design approach and method used to achieve the objectives of this design object is to use "Biophilic Architecture".

Community mental health centres represent a formal reflection of the professional goal of providing complete care and continuity of respect for the prevention, early detection, treatment, and follow-up of mental disorders in a defined population [11].

Biophilic design is a design approach based on the biophilic aspect intended to create a space that can improve the welfare of human life physically and mentally by approaching a positive relationship between humans and nature [12].

### Design Location

Location is one of the most important factors in a design. Therefore it is crucial to determine the right place according to the purpose and design theme. The location or site that will be used to design the Mental Health Center building is on Jl. Deli Tua – Pancur Batu, Durin Tunggal Kec. Pancur Batu, Kab. Deli Serdang. The place was chosen because it followed the criteria for determining the design location that had been determined.

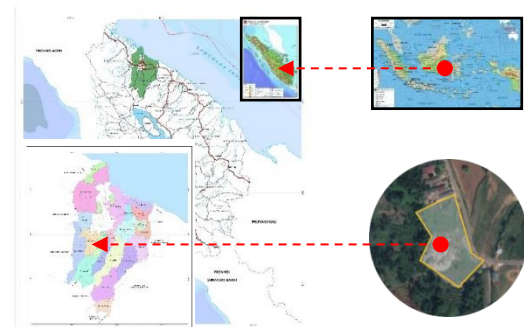


Figure 1. Design Location Map

### Object Description

Types of psychiatric facilities are divided into 6 [11], namely: **First**, community mental health centres, which represent a formal reflection of the professional goal of providing complete services and continuity of care for the prevention, early detection, treatment, and follow-up of mental disorders in a defined population.

**Second**, outpatient psychiatric clinic, a psychiatrist takes responsibility for providing diagnostic, consultation, and therapeutic services to outpatients with the help of a professional staff covering at least the disciplines of psychiatry, psychology, and social work. This staff core can be augmented as needed by representatives from related fields, such as paediatrics, internal medicine, neurology, mental health care, speech therapy, repair techniques, physical and occupational therapy, and rehabilitation.

**Third**, psychiatric services in public hospitals must think about their responsibilities for people who present themselves with psychiatric symptoms sequentially to receive patients or assist in rapid referral to the nearest care source capable of providing prompt diagnosis and treatment for some instances. The feasibility of establishing a public hospital psychiatric service as part of a comprehensive network of public health programs consists of many factors, including local needs, availability of other facilities, availability of staff, and orientation of medical professionals in the hospital and community.

**Fourth**, private mental hospitals are non-government exceptional hospitals. Like public

hospitals, they can be operated either on a non-profit or for-profit basis. They have a responsibility to provide a treatment program with a view to the patient's well-being, with the realisation that the length of hospitalisation may be only one segment of the total treatment plan.

**Fifth**, a general mental hospital is an institution provided by the community, whether city, county, state, province, or federal government, to diagnose, treat, and care of patients with psychiatric and neurological disorders. Most hospitals in this group are state or provincial hospitals. They provide short-term and long-term treatment and accept patients both voluntarily and by legal commitment.

**Sixth**, the service for mental retardation/mental retardation is a place of care, treatment, and training for retarded children.

From the description of the types of psychiatry above, I decided to combine the functions of the community mental health centres with the outpatient psychiatric clinic in the design of this Mental Health Center building.

### Design Theme

Biophilic design is a design approach based on the biophilic aspect intended to create a space that can improve the welfare of human life physically and mentally by approaching a positive relationship between humans and nature [12].

Biophilic design accommodates humans to live and work in a healthy environment, reduce stress levels, and make life prosperous by bringing nature, both with natural materials and natural forms, into the design. Biophilic design seeks to create a healthy environment for modern society [13].

The biophilic design provides a reciprocal relationship between humans and nature and living systems. Biophilic design aims to provide a space that can restore humans' physical and psychic/mental, nourish the nervous system, and give an aesthetic lifestyle [14].

Three main design patterns are outlined in the 14 design principles [12]. The first pattern is a nature in the space patterns described in seven design principles: visual connection with nature,

non-visual connection with nature, non-rhythmic sensory stimuli, thermal and airflow variability, water dynamic and diffuse light, and relationship with natural systems.

The second pattern is a natural analogues pattern that can be described in three design principles: biomorphic forms and patterns, material connection with nature, and complexity and order.

The third pattern is the nature of the spatial patterns described in four design principles: prospect, refuge, mystery, and risk/peril.

### METHODS

The method of determining the architectural design theme used as an approach to this design was chosen based on several things, including:

1. Recent issues related to the design object  
The design of the Mental Health Center was motivated by an awareness of the importance of mental health in the demographic bonus era. The basic design reference is seen from the events in the community so that the object needs to be built. The community issues are then explored qualitatively by looking for data sources from related books and journals.

2. Problem identification  
The issues that developed then became a reference for the design of this Mental Health Center, then identified and assessed to determine the location and deepen the theme that will be applied to the design.

3. Determination of the design theme  
On the growing issue of the importance of mental health in a society that is currently in the demographic bonus era, because mental disorders can reduce the level of productivity at work and interfere with a person's life. This is seen from the fact that humans cannot be separated from their dependence on nature. So the biophilic theme was chosen as a problem solver.

This method of designing a Mental Health Center uses qualitative research methods, is a research method that prioritises in-depth understanding of a problem rather than looking at the problem for general research [15].

The data collection method used a literature study that searched for information and data that supported the research. The sources used in the literature study are in the form of books, research journals, archives, or projects that have been built according to the function and design theme.

The data analysis method used in completing this Mental Health Center research is a qualitative data analysis method that will go through several processes carried out by analyzing the biophilic design and then comparing it with interior design facility standards, namely: data collection, data reduction, data presentation, and conclusions or conclusions verification. After the data has been collected, the next step is to choose an existing location for the design. After that, make a design according to the principles of biophilic design.

## RESULTS AND DISCUSSION

### Design Concept

The design concept uses biophilic design principles. Three main design patterns are translated into 14 design principles.

### The First Pattern is a Nature in the Space Patterns

- Visual connection with nature

The application of a visual connection with nature naturally occurs in the Mental Health Center building by placing a tree which is a natural element, in the middle of the inpatient building (Figure 2. a) and between the connecting bridge to the rooftop (Figure 2. b). On the 2nd floor, which functions as a rehabilitation and meeting room, wide openings are provided so that the patient's line of sight to the outside is not blocked (Figure 2. b).



(a)



(b)



Figure 2. Visual Connection with Nature

While the simulation or construction can be seen from the green rooftop landscape design (Figure 3. a) that puts plants, trees, and pools of water (Figure 3. b).

Buildings that have a visual connection with nature provide a sense of comfort, relieve stress, a more positive emotional state, and improve concentration as well as patient recovery.



(a)



(b)

Figure 3. Plants, Trees, and Water Pools on the Green Rooftop

- Non-visual connection with nature

### Sound

There is a stream of water at the back of the building, which produces the sound of water ripples that can calm the mind when the patient hears.

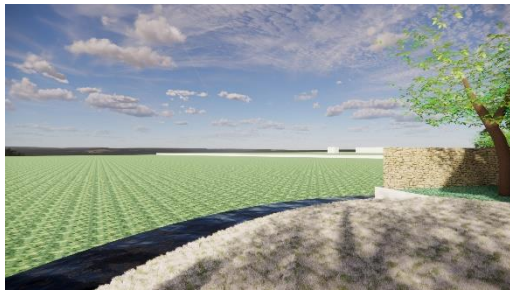


Figure 4. Sound

### Touch

Using materials such as wood and natural stone in the interior can bring a natural atmosphere to the room. The appearance of the interior that seems unfinished also provides a natural touch.



Figure 5. Touch

### Scent

Placing plants in buildings that use potted media or directly to the ground and the presence of small rocks produce a very natural, distinctive aroma.



Figure 6. Scent

**Taste**

The trees in the open space that connects the front and back buildings give a sense of being in the wild.



**Figure 7.** Taste

- Non-rhythmic sensory stimuli

The non-rhythmic sensory stimuli strategy is seen from the reciprocal relationship between the building and the surrounding landscape. Openings and skylights include sunlight moving shadows change at any time, and the selection of plants that can attract bees or butterflies is a way to avoid saturation in patients because natural movements can positively impact the brain rather than repetitive rhythmic movements - repeat. Repetitive rhythmic movements will only briefly attract a person's attention.



**Figure 8.** Non-Rhythmic Sensory Stimuli

- Thermal and airflow variability

Void in the middle of the room as natural lighting and air circulation (**Figure 9. a**). The elongated shape of the building is also the provision of a roster in the room in applying cross ventilation (**Figure 9. b**).



(a)



(b)

**Figure 9.** Indoor Horizontal and Vertical Aperture

It provides wide openings horizontally and natural ventilation efforts in the room (**Figure 10. a**, **Figure 10. b**). The presence of shade trees in open spaces can lower the temperature (**Figure 10. a**). To absorb heat, it is also carried out by using natural materials both in the interior and exterior of the building.



(a)



(b)

**Figure 10.** Horizontal Aperture

- Presence of water

The presence of water at points such as fountains, streams, and ponds enhances the experience of space in a calming way, encourages contemplation, improves mood, and can recover from mental fatigue.



Figure 11. Presence of Water

- Dynamic and diffuse light

Dynamic and diffuse light patterns can elicit a positive psychological response when stimulating the eyes. The vertical lighting of the skylights and ceiling provides a visually soothing effect.



Figure 12. Dynamic and Diffuse Light

- Connection with natural systems

The presence of green roofs and open spaces provide a close connection to natural systems. Patients can observe the behaviour of birds

perching on tree branches or butterflies or bees perching on flowers to suck their juices. This is to increase the patient's awareness of the nature of an ecosystem.



Figure 13. Connection with Natural Systems

### The Second Pattern is a Nature Analogues Patterns

- Biomorphic forms and patterns

Biomorphic forms and patterns can be seen from the facade of the building that uses double skin in the form of a wooden lattice that gives a visual effect like a tree trunk (Figure 14. a). In addition, the green wall is a filter for the environment, which removes glare and dust, keeps the room cool, and can reduce noise (Figure 14. b).



(a)



(b)

Figure 14. Biomorphic Forms and Patterns

- Material connection with nature

For the second aspect of the analogy pattern of nature, namely material connection with nature. This can be seen from the Mental Health Center building, which uses natural materials such as wood and plants in its interior and exterior. The application of colour to structures also has characteristics of the natural atmosphere, namely stone and soil. Therefore, it can cause a positive visual response and display a dynamic nature for the viewer.



Figure 15. Material Connection with Nature

- Complexity and order

The principle of design complexity and order can be seen from the form of mass composition or the interior of the building, which is made repeatedly and in various forms. The formation and arrangement of patterns like this can provide balance/harmony that produces positive psychological effects.



Figure 16. Complexity and Order

### The Third Pattern is a Nature of the Space Patterns

- Prospect

A space that has good prospects is that it feels open and free. This pattern aims to provide a space for the user to visually monitor the surrounding environment from a high position to increase prospects.



Figure 17. Prospect



- Refuge

A room with good refuge conditions will provide a sense of security and be away from noise sources so that patients can rest or heal. In this case, use the gazebo as a refuge at the Mental Health Center.



Figure 18. Refuge

- Mystery

A room with good mystery conditions can make building users curious and tempted to explore the space further. In this design, using a patterned roster to create a hidden impression and the flow of user movement outside the room on curved and closed paths.

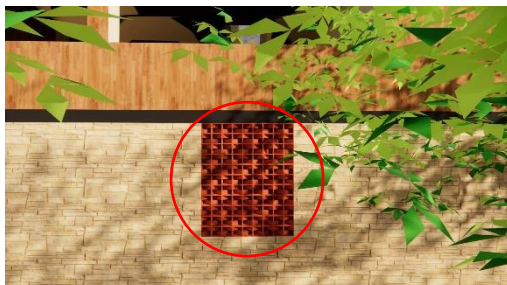


Figure 19. Mystery

- Risk/peril

Spaces that have good risk/peril conditions feel good and with an implied threat. One thought that it might be dangerous but exciting, worth exploring and couldn't contain one's curiosity.



Figure 20. Risk/Peril

## CONCLUSION

Mental health disorders that are increasing every year are worrying because they hurt sufferers. Therefore, the Mental Health Center is expected to be able to become a place for healing. Considering its function as a health facility, the Mental Health Center building is designed with attention to aspects of user comfort. So that the healing process can improve adequately, the application of biophilic designs in buildings can positively impact patients so that their quality of life returns to normal.

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