

Alzheimer Rehabilitation Center Design using Natural Lighting Aspect in the Context of Healing Architecture

Dila Permatasari
Graduate Student of Architecture Department
Institute Technology Sepuluh Nopember
Surabaya, Indonesia

Bambang Soemardiono, Purwanita Setijanti
Lecturers of Architecture Department
Institute Technology Sepuluh Nopember
Surabaya, Indonesia

Abstract — Medical rehabilitation is a therapeutic center on a large scale that treats patients with physical and neurological dysfunction. A rehabilitation center should be close to the indicators of comfort, beauty, and able to give a positive impact for both its users and the surrounding environment. In the case of Alzheimer's, the disease decreased brain's ability and function that most often affects elderly aged 60 and over, this psychological condition has slightly different characteristics with patients of other diseases, such as: symptoms of time disorientation and the tendency to "wander" which makes them astray and forget their way back home. Therefore, it needs a residential complex with a healing environment that is capable of supporting the characteristics.

In its relation with the healing environment that is able to restore patients' physical and psychological balance, the issue of healing architecture with natural lighting approach as one of its core components was chosen in this study of Alzheimer's Rehabilitation Center in Surabaya. Natural lighting is proven to be effective in helping Alzheimer's patients' healing and recovery. The implementation is based on the building orientation, patients' circulation inside the building, as well as the exterior and interior materials that may help the lighting to spread evenly and has a positive psychological effect in accordance with Alzheimer's patients' characteristics.

The result of the study is in the form of mass formation in the tread design, the circulation in the tread between masses and interior of the building, and the selection of materials to suit the characters of Alzheimer's patients and the principle of natural light in the context of healing architecture.

Keywords— *Natural Lighting, Healing Architecture, Rehabilitation, Alzheimer's*

I. INTRODUCTION

Alzheimer's disease is one form of dementia most often found in the clinic. Dementia is a brain disorder that affects a person's ability to carry out daily activities. WHO (2011) stated that approximately one million Indonesian people over age 60 suffer from Alzheimer's. These figures do not include patients who have not or do not report the condition of the disease because they do not know Dementia in a form of Alzheimer's is a disease. It is predicted that Alzheimer's patients will be growing in number form 3

million people to 5 million people in 2030. The increase of the number of Alzheimer's patients is directly proportional to the increasing life expectancy of the population. Approximately 5% of elderly age 65-70 are suffering from dementia and has doubled every 5 years to reach over 45% at the age above 85 (MOH, 2000).

Although it is less popular, in fact, Alzheimer's is 5th most deadly disease in the world. It came quietly and growing slowly and progressively. Alzheimer's patients generally will feel the emotions are changeable. They can at any time be aggressive, quick to anger, and losing interest in social interaction. Sometimes they are also hallucinating and seeing things and crying out of fear, and they will follow wherever the nurse go. Patients' sleep patterns will change. They will awake at night and sleep soundly during the day. If it is up to the acute stage they will experience time disorientation. They will not recognize the existence of day and night. Environment and light are important factors that affect the behavior and the main function of individuals with Alzheimer's. Shading placement, integration with public space in the building, material orientation and selection can help the recovery of people with Alzheimer's because their main tendency is to seek sunlight (Campbell et al, 1988;. Calkins, 1988; Cohen & Weisman, 1988).

One of the healing architecture's components that will be appointed as an issue in this design is the natural lighting. Through natural lighting, an environment or atmosphere that will help the recovery process will be achieved. Natural lighting is one of the crucial factors in design due to the effect that may create a certain image that is intended to be presented in accordance with observer's social condition. In architecture, natural lighting use is one of the essential elements that cannot be separated from the designing process. Natural lighting is capable of creating visual space. Lechner (1930) stated that the lack of light inside a room may cause the room to feel dark and cold, while excessive light can be too blinding and unhealthy for the eyes. Lighting is important in achieving convenience inside a room. To obtain visual comfort in the room, the lighting can be designed to accentuate the object, or add special attraction of the corners of the room. Physical comfort of the user's perception can be influenced by the amount of natural light and its intensity

when they are in a room. Natural light has the potential to change the brightness, color, and direction of light each time, so as to produce a different mood in the room.

From the above we can learn that the Alzheimer's patients are not only physically weak, but also suffer severe psychological problems. Since so far the drug for Alzheimer's disease has not been found, the patient is not only given the physical treatment but highly recommended psychological treatments such as therapy assisted by a nurse / family 24 hours nonstop to be near them. In relation to the physical in which the patient is treated, a facility is deemed necessary for the sake of good atmosphere of physical space and it is also necessary that the hospital is equipped with natural lighting in a healing environment to help the patient recovery process and reduce mental stress experienced by nurses from attending the patients 24/7. Thus in solving the problem in Alzheimer's Rehabilitation Center, the following questions are required:

a) What aspects of design are required in designing Alzheimer's Rehabilitation Center so that criteria in helping recovery process can be obtained?

b) How to put a proper orientation of the building so that natural light can be spread evenly on the entire mass of the tread in Alzheimer Rehabilitation Center?

c) How does the concept of circulation and material selection on Alzheimer's Rehabilitation Center in accordance with the characteristics of Alzheimer's patients so as to make the patients feel comfortable and help the therapeutic process effectively?

II. THEORY

A. Alzheimer's

According to Whitbourne (2003), Alzheimer's is known as one of the most frequently encountered as a cause of dementia. Dementia is a cognitive impairment / intellectual impairment / memory degradation disease that is generally progressive and irreversible. Dementia causes the sufferer to undergo difficulties with daily activities and social interaction and association. Dementia caused by Alzheimer's is usually accompanied by pathological changes in the brains of sufferers. The time for Alzheimer's disease to spread on a person varies from 5 to 20 years. According to dr. Samino, Sp.S (K), neurologist from Cipto Mangunkusumo Hospital, Jakarta, Alzheimer dementia differs from normal aging process because it causes the appearance of mental, emotional and behavioral changes. Alzheimer's usually occurs on the elderly, but the symptoms can be detected 20 years before early onset.

Below are the symptoms of Alzheimer's presented by National Alzheimer's Association (2003) that are divided into 3 stages, namely:

- a) Mild Symptoms
- Often confused and keep forgetting new informations
 - Disorientation: getting lost in neighboring area
 - Troubled in performing routine tasks
 - Experiencing a change in personality

b) Secondary Symptoms

- Difficulty in doing daily activities
- Anxiety, suspicious, and agitation
- Having trouble sleeping
- Wandering
- Having difficulty in recognizing family and friends.

c) Acute Symptoms

- Difficult / lost the ability to speak
- Loss of appetite, weight loss
- Not being able to control defecating
- Highly dependent on caregivers

But in general there are four specific characteristics that are often found in patients with Alzheimer's disease, namely:

a) Emotional Instability

The initial symptoms most easily seen in people with Alzheimer's is the emotional ups and downs / unstable. Usually occurs because early stage patients start disorienting in terms of behavior and identity and having difficulty of finding places. They begin to get lost, forget the direction of the way home when traveling, also begin to forget the name of their kin. Sometimes the symptoms are almost similar to bipolar symptoms such as sudden cry and laugh for no reason. Therefore, patients with Alzheimer's should not be separated from the treating scrutiny because the consequences can be quite fatal (Pustaka Medik, 2008).

b) Introverted Behavior

Alzheimer's patients tend not to socialize with their surroundings. They withdraw from the herd and show no enthusiasm for hobbies and activities they previously did. They are also having difficulty to take decisions. This introverted/reclusive tendency is considered life-threatening because if it is not treated properly, the patients could spend the rest of their lives on their bed that can potentially cause or induce other diseases that can cause early death (Pustaka Medik, 2008).

c) Personality Disorders

The tendency of being easily irritated, suspicious, and offended is the symptoms of secondary stage of Alzheimer's. This will get worse once the sun is set since their emotional state will be even more unstable with the absence of sunlight. Accusing people indiscriminately and doing other extreme things such as fleeing from home are the symptoms of acute stage of Alzheimer's (Pustaka Medik, 2008).

d) Delusion

Their tendency to move / wander around and look for a light at night requires them to sleep with the lights on. Delusions experienced by these people because they say they see subtle shadows often happens that unconsciously they would scream in fear. This had been the main reason they are often secretly stalking nurses wherever the nurse left (Pustaka Medik, 2008).

B. Natural Lighting and Healing Architecture

Choi et al (2012), found that there was a significant relationship between healing environment during the day in the room and the mean length of hospital stay records. 25% of the comparison shows that, during sunny morning, patients that are hospitalized in a room located in the southeast, recovered faster than patients hospitalized in a room located in the northwest area (an area with less light). Patients hospitalized in a room with high light intensity have a more stable psychiatric conditions, they show many positive aspects, even the greatest effect is the speed of their recovery can be 3-5 days faster than patients treated or hospitalized in a room with less natural light intensity (Benedetti, 2001). There are several success factors for the spread of natural light, according to some criteria are:

- Opening location (sidelighting, top lighting)
- The size of the openings (windows, skylights, etc.)
- Spaces geometry (thickness, width, and height)
- Lighting access (consideration of site, building, room, etc.)
- Space's reflection surface
- The location of the opening space

From some of the factors above, it can be concluded that the design of the openings can not be done randomly. Study on the direction of the sun which changes constantly to tread, the condition of the sky every day, the shape of the room, and others, can be used as an indicator in the distribution of natural light in order to efficiently seep in and function properly. To distribute the sunlight evenly and maximally, a media is needed to distribute it into the room, for example with a window. Here are some basic strategies in laying window:

a) Side Window

Skylight that passed through the window has a smaller diffuse suited for spaces that are more private with minimal light penetration but continuous.

b) Celestury System

The effect that can be achieved is visual and psychological comfort on patients that can be obtained at once from the appropriate shading effect, to anticipate too much sun glare. One is laid out like a side window, and the other is laid out on the other side of the wall with a height equal to the ceiling.

c) Combined side-system

Combining side window and celestury system, this strategy is more balance in terms of light distribution than the side window or celestury system respectively. Interior walls perpendicular to the window can serve as a reflector to reduce the centered light intensity. The ratio of the reflected light of sun glare from the window can also be reduced by the surrounding wall.

d) Lightself system

This method managed to distribute the light into a room more than a room that only has one side window. Lightself system placed on the exterior can reduce glare from the sky as well as excessive heat resulting from direct natural lighting.

Having discovered the relationship between natural lighting and healing architecture, some design guidelines for Alzheimer's patients in the aspect of natural lighting that can provide positive stimuli for patients can be made (Design For Alzheimer's Disease, 2008) :

1) Increasing Illuminating Level

Illuminating level needs to be improved to avert loss of visual acuity caused by the aging process. Proper lighting can help compensating poor vision in many ways. Improved lighting and visual environment will often lead to new interest and optimism, and in Alzheimer's patients, it may increase their mobility, and make them stay active.

2) Consistent Natural Lighting

Try to achieve a high level of illumination but still create an atmosphere like being at home. However, excessive level of light intensity can produce scary shadows. It is not good for Alzheimer's patients psychological state, because it may cause them to feel upset and confused.

3) Eliminating Sun Glare

Glare directly derived from natural light sources that can not be intercepted should be avoided. Excessive bright light may give unhealthy effects on the normal person, but a damage may occur in Alzheimer's patients. Incoming light that seep in through the glass / other material slowly will indirectly contribute to comfort, it also helps minimize the feeling of confusion in Alzheimer's patients. It is often assumed that Alzheimer's patients avoid lights when in fact they avoid glare.

4) Changing the Lighting Level Periodically

A transition room between outdoor area basking with sunlight directly and the indoor area is needed. The poor eyesight of the elder adapts poorly to the change of lighting level.

5) Access to Natural Lighting

Since Alzheimer's patients have time disorientation, they have the tendency to keep seeking lights. Natural lights must be able to be accessed properly both indoor and outdoor. The natural light distribution indoor can be done by exploring the openings based on its function and space zone.

C. Design Criteria

After a review, the design criteria well-suited for natural lighting strategy in the Rehabilitation Center are:

1) Orientation

- Since Alzheimer's patients have time disorientation, they have the tendency to keep seeking lights as their marker, the main orientation of the building of Alzheimer's Rehabilitation Center is the courtyard. It is intended for all the indoor rooms to be connected to the outdoor area so that the natural light can be distributed evenly and directly accepted by the patients optimally.

- The residence/rooms orientation must not face the quiet area to avoid delusion that may be experienced by the patients. The rooms shall face onto the center of the activity with greenery view for optimal natural lighting that can provide positive stimuli for Alzheimer's patients to mingle and eliminate their tendency to be a recluse.

2) Circulation

- Corridor is a crucial area that must receive sufficient sunlight. The position of these corridors must be in line with outdoor area. Along the corridor, a handrail must be provided or installed on the wall to help the Alzheimer's patient to walk or as their guide since they tend to forget where they live.

- Avoid focused incoming light and the absence of light (darkness) indoor. The influence of these two things can make Alzheimer's patients' emotions such as anxiety and excessive fear peaked.

3) Material

- Avoid contrasting colors and patterns to avoid excessive glare from the reflection of incoming natural light. In addition, the use of curtains, e-glass, and carpet can also help minimize excessive natural light. This helps Alzheimer's patients' psychological state remain free but still feel calm and safe.

- The interior of each room should be made different. We recommend using natural materials and warm colors, natural lighting can give the different perception for each room so it can provide positive energy for Alzheimer's patients.

III. RESEARCH METHODS

The design process started as the designer thinks about the typology and function of the building. Cross (1984) stated that there are two methods to design, namely, creative method and rational method. This opinion is in line with John Ziesel (1984) mentioning schematic design in designing stages: imaging, presenting, dan testing. The design of Alzheimer's Rehabilitation Center has 5 characteristics, namely:

1. 3 main steps, namely: imaging, which means offering something new and providing future architectural criteria, presenting, in a form of the criteria applied in the design, testing, in a form of design evaluation that has been produced based on the criteria, they are performed based on empirical knowledge (data available)

2. The designing process is always directed to a specific area and unchangeable (a domain of acceptable responses)

3. The use of information divided into two: catalysts & heuristics to perform imaging and as a body of knowledge to perform testing

4. The process of designing is a series of concept improvement (conceptual shift) or creative leaps.

5. This process is a spiral metaphor that is always moving to realize a design that is ready to build.

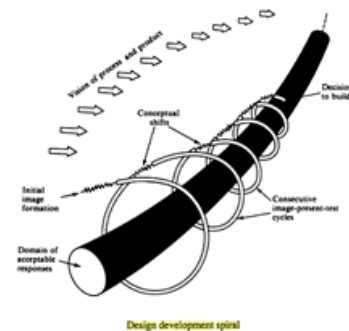


Fig1 Design Development Spiral (Zeisel 1984)

In the context of designed Rehabilitation Clinic, evidence-based design placed first in the domain of acceptable response region, some literature research on the natural lighting in health care buildings that can help to give effect to the patients' recovery. Here is the schematic design process adapted from Zeisel (1984):

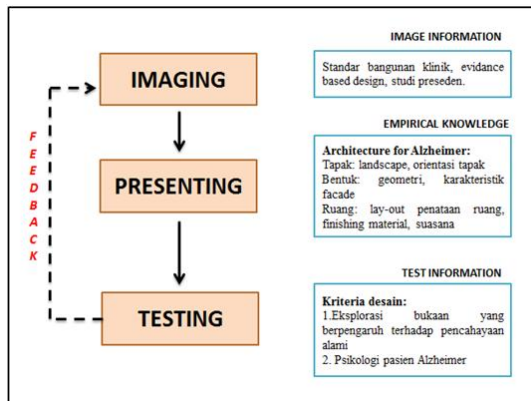


Fig2: Design Process Scheme

IV. OVERVIEW THE RESEARCH LOCATION

The choice of location for Alzheimer rehabilitation center is an important factor that can help the recovery process for patients with Alzheimer's. The location in terms of the needs of the patient and the appropriate environmental conditions, both in terms of access, site orientation, as well as noise. Alzheimer's patients have a characteristic emotional instability, closed, personality disorder, and delusional. In this thesis discussed is a rehabilitation center that is able to help the characteristic of delusional therapy in Alzheimer's patients in the form of disorientation of time and hobby wander. This is associated with aspects of natural lighting in the context of healing architecture that will greatly influence the orientation of the building and laying the masses in a footprint. Therefore selecting the right location will greatly assist the healing therapy of Alzheimer's patients.



Fig3: The location of Alzheimer Rehabilitation Center
Source: Google maps, 2015

The location is located right at the entrance of the Galaxy Earth Permai housing, accessible via the main road which is in the north land and secondary roads that are in GBP housing which is in the western border area as shown in Figure 4.5. Access to the land is very important because it will affect the orientation of the building mass, given the design of the thesis is a design of Alzheimer's rehabilitation center are

required to have very tight security so that the patient is not easily lost while wandering. In addition to entry, which take into account is the noise level at the site. Because the site is directly adjacent to several public facilities such as schools, apartment, colleges, and hospitals are located right on the main highway, the noise in this area occurred at 7:00 to 8:00 o'clock when school activities and offices began. And 15:00 to 17:00 o'clock when the activity ends. In addition to these hours, noise is classified as very low. Land around the building no more than four floors, the other on the potential of the land associated with the view, wind direction and magnitude of natural lighting to be received directly from the sun. Natural lighting is a major aspect discussed in this thesis design planning because sunlight is needed in the process of healing therapies in Alzheimer's patients

V. DISCUSSION

A. Alzheimer Patient Behavior Analysis

Behavioral characteristics of Alzheimer's patients who have multiple personality disorder as anxious, closed, delusional, sundown syndrome, and hobby wander. In the discussion of this design thesis discussed are two main disorders that sundown syndrome and hobby wander. Disturbance "wandering" experienced by people with Alzheimer's personality is caused by boredom, disorientation and solitary habits of the atmosphere too crowded (Coons, 1988). This can be overcome by making the loop circulation path both inside and outside the room, and assisted with natural lighting that is able to be the guiding direction for patients who are wandering. Alzheimer's patients will feel fear when finding the dark and negative space (Cohen & Day, 1993). As with any nuisance "stragglers", nuisance "sundown syndrome", too, is a sensory disorientation in which patients are unable to distinguish between day and night continuously. These disorders can also be minimized by sun light therapy is capable of being a marker of time directly. Natural lighting and behavior are closely related to Alzheimer's patients, therefore, be used as the main approach in the design of Alzheimer's rehabilitation center. Natural lighting has a role to help create the configuration of the site and the space according to the needs of the patient.

B. Analysis Tread According To Climate and Circulation Building Rehabilitation Center Alzheimer's

Basically the location of Surabaya, which is in the area south of the equator gets enough solar radiation to the northern part always gets excessive sunlight than the south are more terbayangi. The movement of the sun in one year can be seen through the solar cycle Surabaya (picture 4.10). The sun moves on the outer track on the north side on June 21 and the south side on 21 December. In September the maximum solar radiation occurs because the sun is teoat at the equator. It happened at 11:00 pm when the sun emits anasnya maximum. The duration of the solar radiation around 1-12 hours of 6:00 to 18:00 o'clock pm. While the largest radiation occurred at 10:00 to 12:00 pm (BMKG Juanda Surabaya, 2011).

Tgl/Bln		6.00	7.00	8.00	9.00	10.00	11.00	12.00
22.12	AZI	114	114	114	116	122	135	180
	ALT	4	16	32	45	58	69	58
21.01/22.11	AZI	109	111	111	109	115	130	180
	ALT	4	18	32	45	58	71	78
21.02/21.10	AZI	99	96	95	94	93	90	180
	ALT	3	16	30	46	60	74	90
21.03/24.09	AZI	90	87	85	82	84	62	360
	ALT	0	15	31	44	58	72	81
22.04/21.08	AZI	83	80	75	70	58	40	360
	ALT	0	14	28	41	53	65	71
21.05/24.07	AZI	67	66	62	56	46	28	360
	ALT	0	19	23	46	47	67	62
22.06	AZI	66	64	60	54	44	26	360
	ALT	0	9	22	35	46	55	60

Fig4: Surabaya Sun Path

In designing the Alzheimer rehabilitation centers, a factor of solar radiation is used as a specific approach to aid healing therapy.

The proposed site oriented to the north and west is very influential on the orientation of the building mass, which becomes a problem for the case of designing this center. Laying the exact mass of the building will be very helpful therapy in Alzheimer's patients. One strategy to help dementia patients in sensory disorientation is stimulating them with games in natural light and artificial light is balanced (Fleming, Forbes & Bennett, 2003). However, direct sunlight is more helpful to focus the patient's attention to a particular object (Calkins, 2002, p.v).

C. Alzheimer's Rehabilitation Programming

Alzheimer's patients may feel some emotion at the same time. They are easily distracted, confused, and uncomfortable when being in a room that contained too many people. Therefore, Alzheimer's patients who were treated in a rehabilitation center should be in small groups each of its group consisted of 10 people (max. 15 persons) and placed into a pavilion which involves a series of some of the rooms according to the number of people in the group, dining room and a shared kitchen, toilet together, and lounge. Each pavilion shall have a green open space along for outdoor activities. (Calkins, 2004). Program space for a rehabilitation center for people with Alzheimer's in accordance with the standard rules contained in Metric + Handbook (2008) and Alzheimer's Disease International Care House (1999) is divided into several pieces 5 mass include:

- The two main mass of residency / dwelling patients, each one building mass is divided into 2 pieces mini pavilions that each pavilion has a thematic park for outdoor activities, 15 single bedroom, 15 private toilet (in the room), 1 lounge, 1 dining room and a shared kitchen, 2 toilets together (outside the room), laundry room, and care giver station.
- 1 mass as a hobby room (room sewing, gardening room, music room, and gymnasium) and a family visiting room.
- 1 mass comprises 2 floors where the ground floor is used as a main lobby, reception, waiting room penjurug, practice and

consultation room doctor on call, cafeteria, and office and administrative staff. As for the 2nd floor consisting of 15 rooms inpatient care giver, where one of his rooms containing 2-3orang, 6 shared toilets, a small kitchen, lounge, and a laundry room.

d) 1 mass as supporting space: space-related Alzheimer's seminar, places of worship, medical equipment warehouse, janitor, room panel, pump and generator room.

D. Natural Lighting as giving shape to the orientation building, circulation, and material

Alzheimer's patient tend to get introverted and not join activities together in a large and crowded space. The exact orientation of the building will make the patient more open and stimulate feelings of happiness. In the draft standard footprint for Alzheimer (Brawley E., 2006), there are three things that must be considered, namely

- 1) Setup mass of the building is based on the division of public zones, servicing, sensory, and cognitive
- 2) Mass which can be accessed by the patient or care giver should deal directly with its open spaces.
- 3) Access in and out differentiated to avoid the crowds on the access that may interfere with the patient.

The main orientation of the building is set up how the sensory zone has an open garden accessible to residents and to the maximum exposure to sunlight but not cause excessive shadows produced by direct sunlight because it can cause fear in a patient when he saw a black shadow on the floor. The park is open in the blocks resident is able to help patients directly familiar surroundings and social interaction with fellow patients.

As for the circulation patterns for Alzheimer's patients, according to Brawley E. (2006) is the type of circulation loop. Circulation loop can assist the patient who wandered hobby and make it easier to find the patient's care giver when Hilan. On the layout of the room, rooms hospitalized patients should be monitored directly by the care giver. Thus the concept of space is as follows: 1) Designing circulation loop which will be applied both inside and outside banguna, because the circulation loop to facilitate the sunlight entering from all sides; 2) The order of clear space will stimulate the patient familiar feeling; 3) Access sensory zones placed side by side with cognitive zone, but separated from the public zones and servicing of the separator in the form of theme parks open.

For natural lighting as giving shape to the material selection, the chosen material like carpet to soundproof room floor resident. Also the selection of neutral colors for the rooms together so as not to cause a foreign feeling when on the move inside. Striking colors only provided as a visual marker element to facilitate patient recall his office. Materials that can cause glare as a large glass, aluminum, and zinc should be avoided to keep the patient from excessive glare disturbance.

From the above it can be concluded some important points that can be relied upon in making the concept of designing a rehabilitation center for Alzheimer's. This draft will be applied

in building orientation, circulation, and the selection of the material in which each part has a specific design concept (table 1):

TABLE 1. The concept of Alzheimer’s Rehabilitation Center

Design Parameters	Design Requirements	Design Concepts
Building Orientation	<ul style="list-style-type: none"> -Secure unlimited access towards open space . - Building gets enough sun intensity , especially in the morning . - The patient lived far apart the public space in order to maintain mental patients. 	<ul style="list-style-type: none"> - The orientation of the building is based on four main zones based on the needs of Alzheimer's patients - The mass of the building that can be accessed by patients and caregivers should be facing open space - Mass public buildings and services are oriented to the north and west because facing the main road while building mass resident and hobby -oriented east and south to get proper natural lighting and not excessive .
Building Circulation	<ul style="list-style-type: none"> -Pathway have to go back to the main entrance , keeping the hobby characters wandering patients . - Avoid a stalemate and negative spaces 	<ul style="list-style-type: none"> -Circulation inside and outside the building using sirkulasi loop to accommodate the characteristics of Alzheimer's patients who like to wander - The order of clear space will help the patient feel familiar and easy to remember. - No negative space.
Building Material	<ul style="list-style-type: none"> - To guardrail should use green plants, so that the patient does not feel strange with iron materials and the like - Use neutral colors for the interior - Avoid material that is capable of causing excessive glare 	<ul style="list-style-type: none"> The material used is preferably natural materials such as wood or bamboo that is close to neutral colors. - Flashy colors are only used as a marker element entrance room / room. Because of the effect produced when exposed to direct sunlight is not good for people with Alzheimer's - Avoiding the use of a material that is able to cause excessive glare and light reflection like glass with width and zinc.

E. Building Orientation Concept

Design mass 1 is formed by the masses that meet three primary design criteria of sunlight as giving shape to the building orientation. This is attributed to the special character of Alzheimer's patients where they tend to avoid excessive sun, but also did not like the room dark room that is not touched by sunlight. Following exploration footprint of the design process mass 1 which is the design chosen for Alzheimer rehabilitation center:

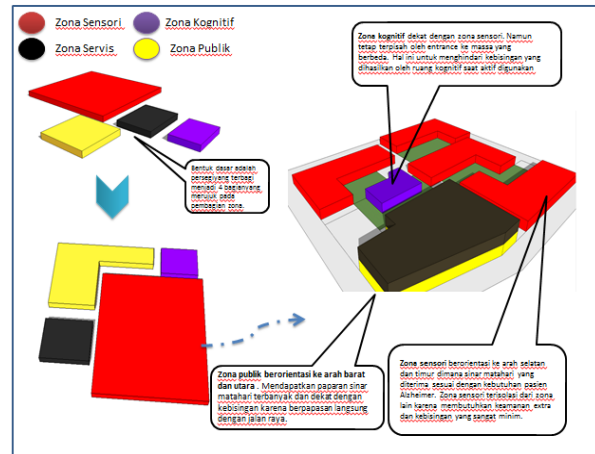
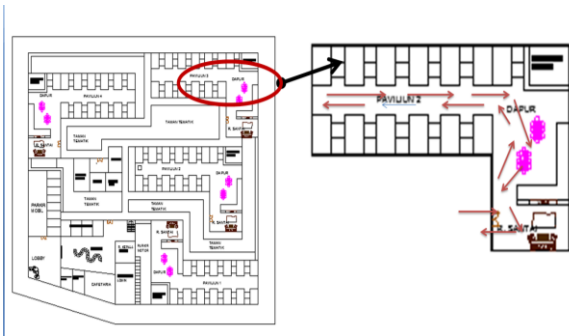


Fig5:The concept of Arrangement Period Building

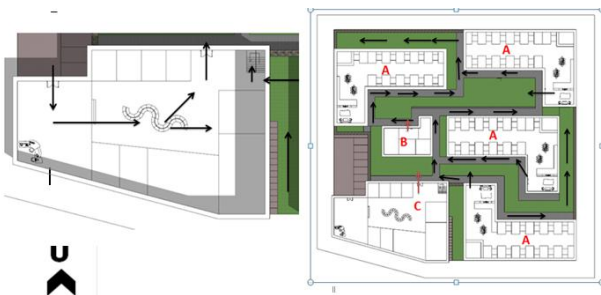
Natural lighting as forming the building mass orientation embodied in the distribution zones visible on the site. Sensory zone is a zone that is at least need sunlight, therefore, access to the zone covered from other areas. Besides the aspect of safety which far, far away wandering Alzheimer's patients will still be supervised by a care giver. As for the cognitive zone is active zone where the stimulus is available to provide stimulation in Alzheimer's patients. Therefore placed with an orientation to the north directly facing the highway so that the patient does not feel isolated and feel familiar with the surrounding environment. Public zones placed in a corner of the site as elements of a rehabilitation center for Alzheimer's identity. In addition sunlight received very maximum as oriented to the north and west. Open garden is also available for public zones, because in addition to the welfare of the patient, care giver welfare is something that needs to be contained

F. Building Circulation Concept

Based on the analysis of the zone that has been done in Chapter 4 , then there are four zones that will be applied to the building , namely the public zones , zones of cognitive , sensory zones and service zones . Those zones would be set either horizontally or vertically . Horizontal zone seen in the design of the site and will be clarified in the draft room , because the design of these rehabilitation centers , horizontal zone is a collection of several mass between patient characteristics and adjust the relationship between space requirements as described in chapter sebelumnya . Assumed the building consists of four masses , with one mass of 2 floor (adjusted for land area and space requirements)



The flow of circulation for patients outside of the pavilion buildings forming the circulation loop in order to restrict the movement of patients. Circulation loop to help steer patients to the original point where the activities stroll occurred. As for the circulation of staff and visitors is limited only to the west side of the floor 1. Except for the guests who have been with the family, provided a special line to get into the pavilion isolation area resident through another gate door in the public zone immediately adjacent to the sensory zone. Care giver for a special lane reserved for heading sensory zone. Care giver has room inpatient facilities, lounge, kitchen, and dining together on the 2nd floor like a public zone resident pavilion because the rate of depression is felt as strong as Alzheimer's patients



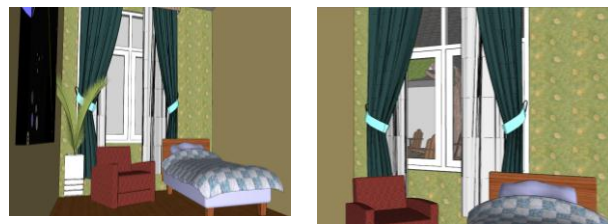
Based on the translation of circulation access based on user behavior inside the building, loop circulation system applied to the sensory zone and cognitive zones where the main users are patient and care giver. Circulation space in the form of this draft in the form of an open corridor centered on thematic gardens spread over most of the site.

G. Building Material Concept

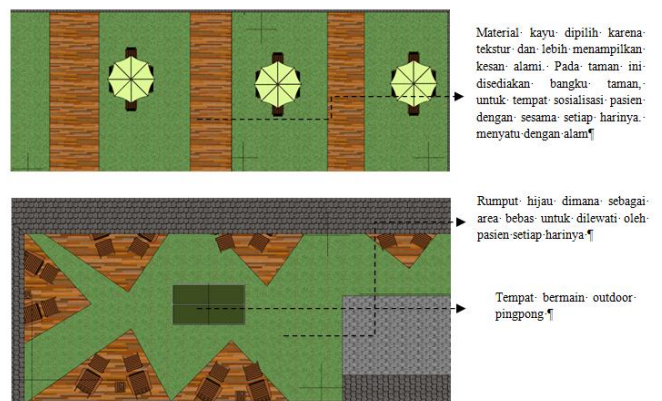
In the thesis of this design approach natural lighting and behaviors of Alzheimer's patients is manifested as giving material form to be used both on the exterior and interior. Space is manifested not only in physical form, but is also determined by the quality aspects that favor comfort such as color, texture, shape, and lighting. Material and proper lighting will help the healing process of someone who is sick. In the case of Alzheimer's, proper lighting and material can help slow the movement of Alzheimer's. The use of neutral colors when exposed to sunlight will make the room feel more spacious, conversely striking colors and use -material glossy material will create excessive glare and make the atmosphere more gloomy. Hammered sunlight on the floor and wall

patterns can also affect a person's psychological condition. Similarly, the use of texture material in decor elements able to stimulate the sense of touch of Alzheimer's patients. Alzheimer's patients avoid large spaces that are foreign and high-ceilinged with color - a striking color.

The bedrooms were developed by presenting the elements of nature, either directly or imitation. Elements of fake plants that do not endanger placed in a corner of the room to give the impression of green in the room. As for the ceiling to menciptakann cozy atmosphere, made 30 cm shorter than 3 m is 2.7 m. Wallpaper constantly placed on one side of the wall, as well as an aesthetic element also serves as signage / marker of the room so that the patient will remember his room. Bedroom patients indirectly is space therapies that can help the healing process of patients. Direct opening towards the outside, is believed to make patients feel more alienated and will eka surrounding environment.



At theme parks are designed with the concept of bringing together nature and Alzheimer's patients. Her position is spreading throughout the footprint make the park into the main circulation center where patients are free to explore and spend time everyday there. Parks became shady as shadowing from buildings surrounding buildings



V.CONCLUSION

Analysis of Alzheimer's draft rehabilitation center in the draft site orientation, circulation, and the material it will get the design that have special characteristics as objects designed for people with Alzheimer's. In a related study design with the precedent explanation. Various characteristics of Alzheimer's sufferers to draft center rehabilitation to be different with other nursing home, because it can affect agitation of Alzheimer's disease itself. To find out the similarities and differences in the design of the precedent, Design's For Alzheimer's research (2008) and the results of the design of the new rehabilitation center for people with

Alzheimer's, then following the above is a comparison table of the conceptual design of the three.

From the comparison between precedent and building design Alzheimer rehabilitation center then obtained the similarities and differences in designing a rehabilitation center with natural lighting design criteria and behavior that Alzheimer's patients as giving shape to the orientation, circulation, and material. The design criteria related to the psychological needs of Alzheimer's patients to help oasis blend in with the surrounding environment and slow agitation of Alzheimer's itself.

The criteria of natural light as giving shape to the building orientation with regard to the division of zoning based on the behavior and needs of Alzheimer which is divided into four zones, namely, zone cognitive, sensory zones, public zones and service zones. Design criteria can be realized in the design footprint and space.

In natural light criteria as giving shape to the circulation is realized on the one-way circulation pattern gate to restrict the behavior of wandering patients and help control care giver. In addition to the clear boundaries between the cognitive and sensory zones where the guardrail is clearly given to help the security aspects .. Security is one of the most important aspects because every movement of the activity of Alzheimer patients should be closely monitored by his care giver.

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