



Space Design Study of Elderly Behavior: Case Study of The Puri Kebajikan Nursing Home, Batam

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ABSTRACT

Along with the changing years, the elderly population in Batam City has increased rapidly. However, facilities such as nursing homes for the elderly are still minorly found in Batam City. Regarding quality, nursing homes in Batam City also have not fully met the standards of design that should be both in terms of quality, facilities and needs for the elderly. The Elderly being the prime residents in a nursing home, of course, need to pay attention to their needs in living in that place, especially the relationship between the behavior of the elderly and the nursing home that provides a reciprocal relationship in the life of the elderly or known as behavioral architecture. Therefore, this research, it is expected to find out the situation related to nursing homes in Batam City by paying attention to the psychological side and comfort of the needs of the elderly. This study uses a combined method of qualitative research and quantitative research (mixed methods). Researchers conducted direct observations and interviews at one of the assisted living in Batam City in addition to literature studies in completing the data collection process. Through this research, it can be concluded that the Puri Kebajikan nursing home has not fully implemented the appropriate design requirements and the application of behavioral architecture to the elderly in nursing homes. It expected to be an increase in the application of facilities at the Puri Kebajikan nursing home as a comfortable residence for the elderly according to their needs.

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1. INTRODUCTION

The elderly are people who are at the phase age of 60 years old or above (Undang-Undang Nomor 13 Tahun 1998 in Badan Pusat Statistik, 2021:3). In every changing year, the elderly population has drastically increased in both terms of numbers and proportion (Badan Pusat Statistik, 2021:3). The percentage of the elderly population 2020 in Batam City can be seen increased to 3.67 percent from 1.61 percent in 2010 based on the results of the population census (Badan Pusat Statistik, 2020). From the data obtained, it can be seen that every year the number of elderly always increases. However, facilities such as existing nursing homes to support the elderly are still minimal in Batam City.

Apart from that, the existence of nursing homes in cities is also needed for the community in helping care for their elderly and also a place for the old age of elderly. However, due to the condition of nursing homes in Batam City that have not met proper quality standards, families and the elderly are reluctant to entrust their elderly to nursing homes. Therefore, through this research, it is expected to be able to find out the situation and conditions related to existing nursing homes in paying attention to the psychological side and comfort of the needs of the elderly as well as the architectural behavior of the elderly towards the design of nursing homes in Batam City.

The elderly, as the primary residents in a nursing home, of course, need to pay attention to their needs in inhabiting the place, especially the relationship between the behavior of the elderly and the nursing home, which provides a reciprocal relationship in the life of the elderly. Behavioral architecture is an architecture that can consider the user's needs from the behavior/habits of the user towards the design that will be produced. In other words, if there is a change in setting adapted to an activity. There will be an impact or influence on human behavior (Tandal and Egam, 2011)(Wicaksono, 2017). Therefore several factors shape the behavior of the elderly in carrying out activities at the Puri Kebajikan nursing home as follows (Setiawan, 1995)(Wicaksono, 2017).

- a. Space, function, and use of space are the most critical things from the influence of space on human behavior, with a range of at most 6 meters (Retrianti, 2016).
- b. Dimension and shape, suitability of dimensions, and shape of an element of space can affect the comfort of the elderly in accessing these elements (Ching, 2007).
- c. Furniture and its arrangement, placing ideal furniture positions should be centralized to make it easy for the elderly to interact (Devi, 2016).
- d. Color, wave frequency, and warm colors can provide a psychological effect that is comfortable and calm, so colors that are suitable for the elderly are light and warm.

In addition to paying attention to the elderly behavior in their activities, it is necessary to apply several standard principles in designing nursing homes. Nursing homes suitable for the elderly are applied to the environment in elderly facilities to assist in elderly activities, namely as follows (Pynoos and Regnier, 1991)(Triariastoto, 2014).

1.1. Physiological aspect

Physiological aspects in nursing home design are very important to ensure the comfort and health of elderly residents, including:

- a. Safety and security, namely conditions in a safe condition with the facilities provided do not endanger its users.
- b. Signage/orientation/wayfinding, a symbol display that provides directions in facilitating location finding.
- c. Accessibility and function, layout, and ease of infrastructure for the elderly facilitate the mobility of the elderly.

- d. Adaptability, the ability of a person to adapt to their environment, can provide the elderly with a sense of security and comfort and a familiar feeling towards their environment, like home.

1.2. Psychological Aspect

Psychological aspects in nursing home design are important to create an environment that supports the mental well-being of residents, including:

- a. Privacy and personalization, an area of the elderly's territory with the hope of having a private environment that is free from other people.
- b. Social interaction, namely social activities carried out by interacting with other people.
- c. Independence, a situation where the elderly are encouraged to carry out activities on their own without the help of others.
- d. Aspects of the five senses, which include the senses of touch, sight, hearing, smell, and taste, help the elderly interpret something that is felt.

2. RESEARCH METHODS

This study combines qualitative and quantitative research (mixed methods) (Newman and Benz, 2008)(Aziz, 2021). In this study, researchers conducted field surveys, observations, and case studies at the Puri Kebajikan nursing home in Batam City to observe and classify the needs of the elderly for their housing. Direct observation of the elderly in the nursing home is also complemented by interviews with other residents and caretakers who often look after the elderly in the nursing home and literature studies as research supporting data. This research was taking place in the afternoon because the elderly can no longer be disturbed and need time to rest at that hour.

The research location will be at one of the nursing homes in Batam City, namely the Puri Kebajikan nursing home managed by the Buddhayana Temple. This nursing home is on Imam Bondjol Road Windsor Central Complex Block 3, First Floor Number 28, Lubuk Baja District, Batam City. Research subjects were conducted with 13 older people and six elderly companions who served at the Puri Kebajikan nursing home in Batam City.

After obtaining the data through observation and interviews, the researcher will check the accuracy using the triangulation method by comparing the similarities and differences in data from each source and then adjusting it factually and optionally (Wijaya, 2018). Sources of data collection carried out consisted of primary data and secondary data. Primary data relates to observations of the movement of the elderly in nursing homes and the needs of the elderly for a nursing home, while secondary data is in the form of collected journals and research that other researchers have conducted before and also data sources obtained from official such as the Central Statistics Agency. The data analysis technique used was also in the form of presenting the data in narrative form as well as in the form of diagrams and schematic pictures about the elderly and nursing homes. At the end of the study, the researcher also provides conclusions and designs solutions that can be applied to nursing homes (Sugiyono, 2016).

3. RESULTS AND DISCUSSION

Through this research, the researcher directly observed the Puri Kebajikan nursing home. They obtained some related information from the elderly who live in the nursing home and the conditions in the nursing home. Based on Figure 1. It can be seen that the elderly population will change over the years, especially from 2020 to 2021, which is the period when the number of COVID-19 cases has increased from 18 people to 14 people.

Some elderly died due to old age, so the families of the elderly have taken the initiative to bring back the elderly to live together so that the number of elderly in 2021 will become nine people.

This year, the elderly in nursing homes experienced the addition of 4 people, namely three men and one woman, so there were 13 older people, with five men and eight women. However, at the nursing home, it was found that there were residents who had not yet reached the age of the elderly living in the nursing home, namely aged 54 and 58 years. That is because, based on the Central Bureau of Statistics in 2021, residents aged 15-59 years are productive residents, while the elderly are humans who are age of 60 years and over (Badan Pusat Statistik, 2021: 18). For the elderly in the nursing home, most of them are old and in declining health conditions. At the nursing homes, most elderly are wheelchair users who are already at ancient age, and some are due to strokes, making it difficult to do their activities.

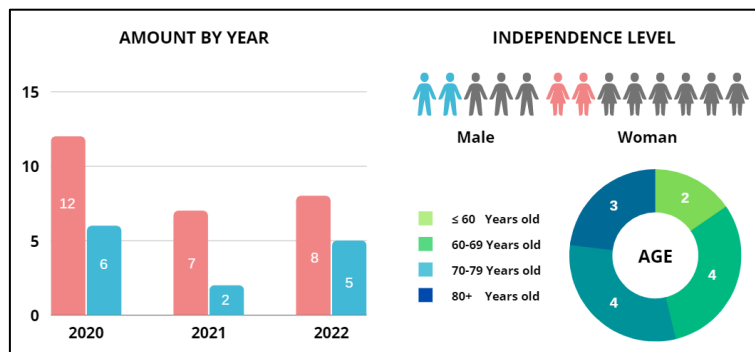


Figure 1. Demographics of the Puri Kebajikan Nursing Home

Source: Author, 2022

The link between elderly behavior and nursing homes also provides a reciprocal relationship in the lives of the elderly. Therefore the researcher describes several variables that can be a factor in shaping the behavior of the elderly in carrying out activities at the Puri Kebajikan nursing home.

1) Space

For the condition of the rooms in the Puri Kebajikan nursing home, it can be seen that most of the rooms are elderly bedrooms which consist of 3 elderly rooms, with each room having a toilet so that it is easy for the elderly to access. In addition, the distance between the elderly's activity rooms is also not far apart so that the elderly can quickly and not get confused when accessing other rooms. Based on direct observation, the rooms often used by the elderly for their activities are primarily located in the outdoor area and living room because the room that can cover all the elderly is only in the outdoor area.

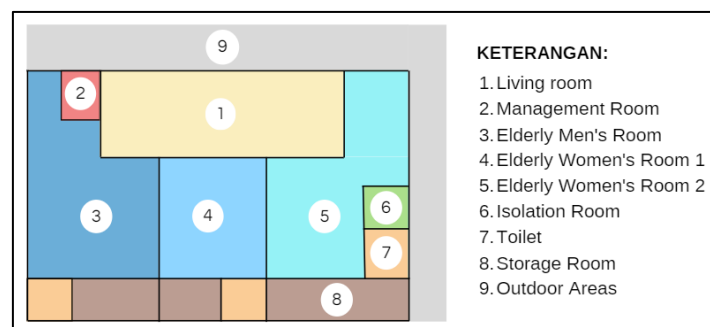


Figure 2. Schematic of the rooms at the Puri Kebajikan Nursing Home

Source: Author, 2022

2) Dimension and Shape

The rooms in the nursing home are rectangular, with an elderly room consisting of 1 male room and two female rooms, each with a toilet. For the capacity of the elderly room, the female elderly room 2 accommodates four elderly with two wheelchair users and three elderly companions. In terms of the proportion of space for users, the distance between mattresses in the elderly's room of 130 cm is considered quite affordable because the standard minimum size distance between mattresses for wheelchair users is recommended to be 120 cm with a better size of 200 cm (Neufert, 2003). Having three elderly wheelchair users in each elderly room is considered relatively narrow because the access hall is only about 150 cm, which one wheelchair user can only access.

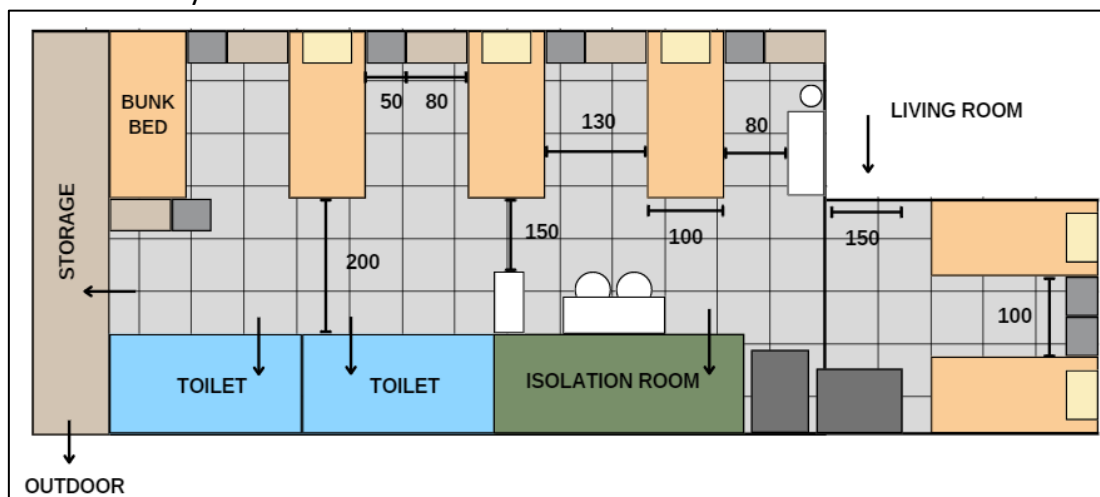


Figure 3. Female Elderly Room Layout 2
Source: Author, 2022



Figure 4. Elderly Room at the Puri Kebajikan Nursing Home
Source: Author, 2022

3) Furniture and Arrangement

For furniture in nursing homes, it was found that there was an iron table with rounded corners on an outdoor elderly table. The table is considered safe enough for the elderly, so when bumped into the furniture, the pain experienced is lower than with a sharp angle. Even some tables did not have rounded corners, which were alternatively provided with black insulation so that the corners became obtuse.

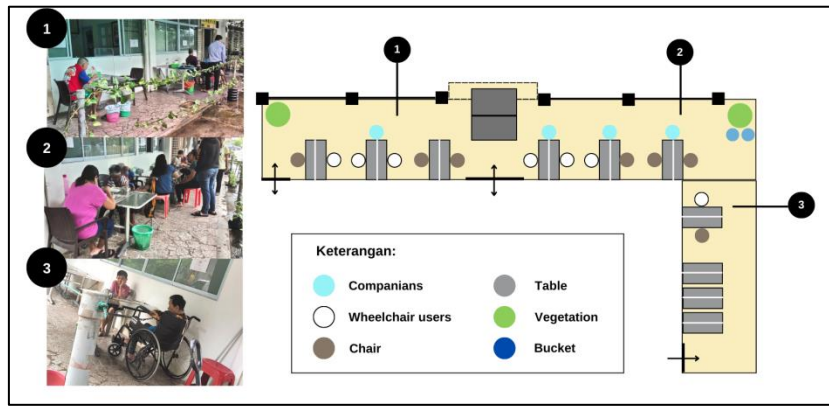


Figure 5. Outdoor Arrangement Layout at the Puri Kebajikan Nursing Home

Source: Author, 2022

In the elderly's room, the arrangement of cupboards and mattresses is also systematic, where they are aligned with each other, and no furniture found can hinder the elderly during their activities in the nursing home, making it easier for the elderly to access the room.

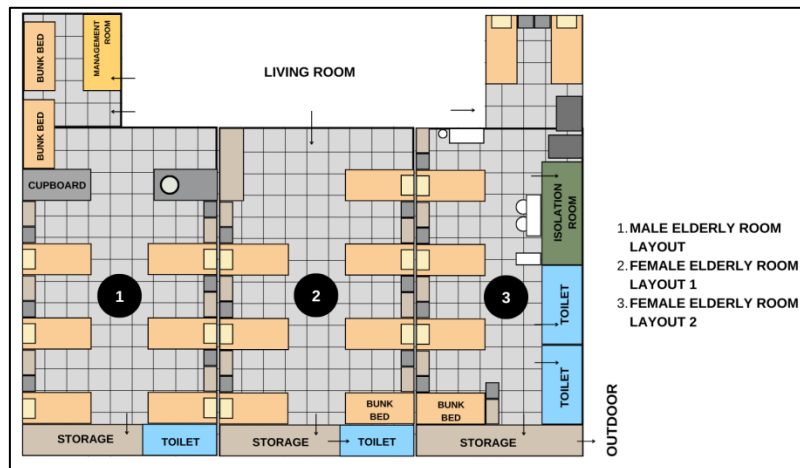


Figure 6. Elderly Rooms Arrangement at the Puri Kebajikan Nursing Home

Source: Author, 2022



Figure 7. Elderly Room Arrangement at the Puri Kebajikan Nursing Home

Source: Author, 2022

4) Color

For the use of room wall color in nursing homes, use white, which makes the nursing home look clean and more accessible for the elderly. In addition, the color combination of furniture in nursing homes also affects the elderly living in nursing homes. For the color combination for each based on the color wheel, most of the colors used are warm colors compared to cold ones.

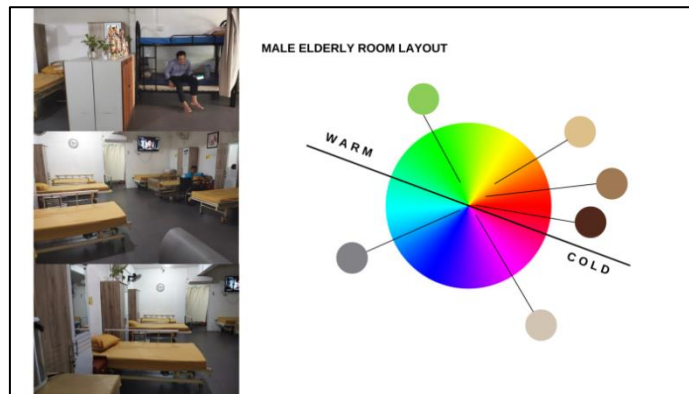


Figure 8. Color Tone Combination in Elderly Men's Room on the Color Wheel
Source: Author, 2022



Figure 9. Color Tone Combination in Elderly Women's Room 1 on the Color Wheel
Source: Author, 2022



Figure 10. Color Tone Combination in Elderly Women's Room 2 on the Color Wheel
Source: Author, 2022

From the findings obtained through direct observation of the elderly in nursing homes, several design aspects were found that were not by the standards of the nursing home design as follows.

A. Physiological Aspect

1) Safety and Security

To maintain the elderly security and safety at the Puri Kebajikan nursing home, it seems that they have made an alternative by installing CCTV (Closed-Circuit Television), which can assist companions to supervise the elderly at any time in various places without at the nursing home. However, as a place for the elderly to do free activities, the outdoor area of the nursing home seems to have not installed a

handrail as a handrail to make it easier for the elderly to walk when they are outside. In addition, it was found that the installation of a rope became a barrier between the activity area of the elderly and the vehicle lane, which was considered less effective. In the outdoor area, vehicles often pass in front of the nursing home, which is considered close enough to endanger the elderly when on the move.



Figure 11. Installation of CCTV in the Outdoor Area of the Puri Kebajikan Nursing Home
Source: Author, 2022



Figure 12. Outdoor Area of the Puri Kebajikan Nursing Home
Source: Author, 2022

2) Signage/Orientation/Wayfinding

Currently, Puri Kebajikan nursing home has not founded any signage/symbols. Because the distance between each room in the nursing home is not too far, and the areas for elderly activities are close together, there is no need for significant markers in homes for the elderly.

3) Accessibility and function

In facilitating the elderly in accessing the toilet, it can be seen that there is an installation of handrails and chairs in the elderly toilet so that the elderly can safely and efficiently carry out their activities in the toilet.



Figure 13. Toilets in the Elderly Room at the Nursing Home
Source: Author, 2022

In facilitating wheelchair users to access nursing homes freely, it can also be seen that the floor with different leveling is given a slope so wheelchair users can easily pass it. However, in the toilet, it can be seen that there are several differences in leveling with limited access that does not have a slope, which significantly hinders the access of the elderly who use wheelchairs and also other older people to access the toilet.

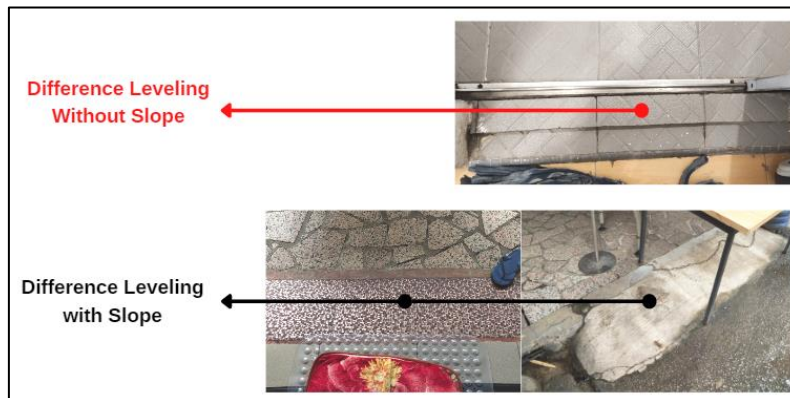


Figure 14. Leveling Differences in Nursing Homes
Source: Author, 2022

In nursing homes, it is seen that they use a sliding door type which makes it easier for the elderly to enter the room because elderly wheelchair users find it difficult to open their doors, which are opened 90 degrees. Also, applying a sliding door can expand the area for the elderly to do activities due to the entrance to the elderly's room being pretty narrow due to the presence of a mattress next to the door and the furniture in the room.



Figure 15. Door at Puri Kebajikan Nursing Home
Source: Author, 2022

In the older men's room, it can also be seen that access to the room requires many maneuvers to get to the elderly's bed, especially for wheelchair users, which is

challenging. In addition, the access area for the elderly's room when entering the room is 120 cm which is considered inconvenient for wheelchair users because the minimum entry area for wheelchair users should be 150 cm (Neufert, 2003).

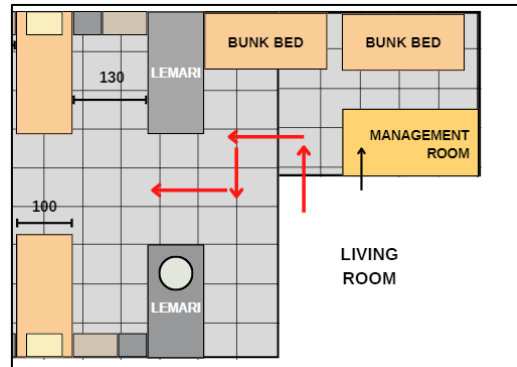


Figure 16. Layout of Access to Elderly Men's Rooms at Puri Kebajikan Nursing Home
Source: Author, 2022

4) Adaptability

Based on the function of the nursing home itself, the existence of a nursing home must be able to give a friendly and familiar impression, like a home for the elderly, because being in a new residential environment can cause a sense of concern for the elderly (Handayani, 2015). Nursing home rooms, in general, give a friendly and familiar impression because it has a shared communal room (living room) connected to the elderly's room and an outdoor environment so that it is easily accessible for the elderly. However, on a micro scale, in the elderly's room, there is no environmental atmosphere that gives a comfortable feeling like home but like a hospital. In the elderly room, there is a used mattress with a shape and layout of the mattress that looks like it is in a hospital's treatment room. Psychologically, the atmosphere at the hospital itself gives a foreign and uncomfortable impression, so the use of these beds in the elderly's rooms is considered uncomfortable, coupled with the mattresses used, which are also hard for the elderly's bodies. Of course, this triggers discomfort for the elderly who are used to living in their home environment until now. They have to get used to living together with other people in an impressive elderly room like in a hospital.



Figure 17. The Atmosphere of the Elderly Room at the Puri Kebajikan Nursing Home
Source: Author, 2022

B. Psychological Aspect:

1) Privacy and Personalization

Regarding privacy for the elderly, especially those who have lived in nursing homes for a long time, they have lost their privacy due to provisions for living with other elderly (McChrystal, 2012). In the Puri Kebajikan nursing home, in terms of

dimensions, it seems that it has not fully met the needs of the elderly. In the elderly's room, the distance between the elderly's mattresses and two cupboards is 130 cm wide, which is the standard distance for elderly wheelchair access (Neufert, 2003). Even though this distance is sufficient for elderly wheelchair users, it has not been fulfilled in terms of visuals for the elderly. Because all the elderly in the room can know each other's whereabouts and the activities carried out by others while in the room, apart from that, in terms of toilet space arrangement in the elderly female room, it is also considered that it has not fully provided privacy for toilet users. Because the toilet door directly faces the position of the elderly mattress, other residents in the same room can easily recognize the elderly in the toilet.

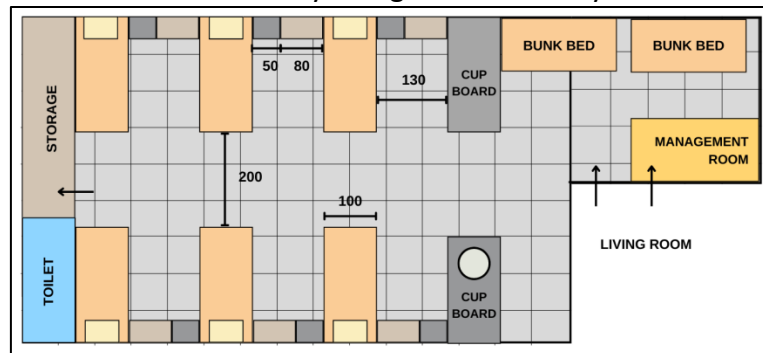


Figure 18. Layout of Elderly Men's Room at the Puri Kebajikan Nursing Home
Source: Author, 2022

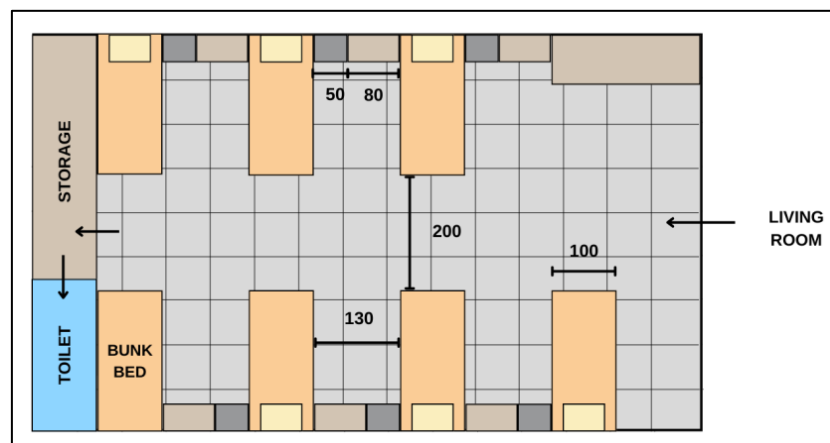


Figure 19. Layout of Elderly Women's Room 1 at the Puri Kebajikan Nursing Home
Source: Author, 2022

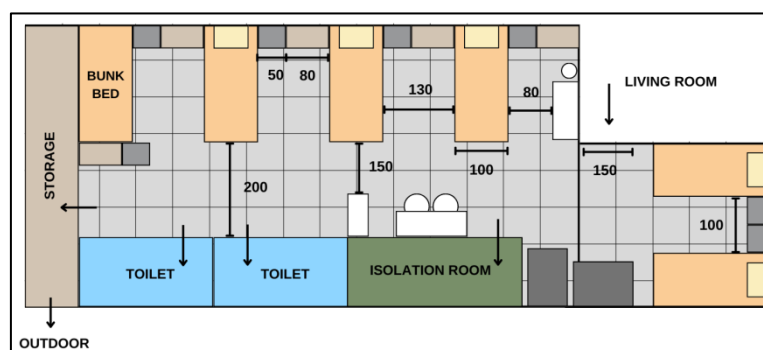


Figure 20. Layout of Elderly Women's Room 2 at the Puri Kebajikan Nursing Home
Source: Author, 2022

2) Social interaction

At the Puri Kebajikan nursing home, most activities for the elderly occur outside the nursing home, from eating, drinking, therapy, and others, with tables placed outside the nursing home lined with acrylic to face each other. From this, it can be seen that the room facilities for the elderly to gather and interact socially in the nursing home are still not adequately fulfilled. Hence, the interaction between the elderly is minimal.

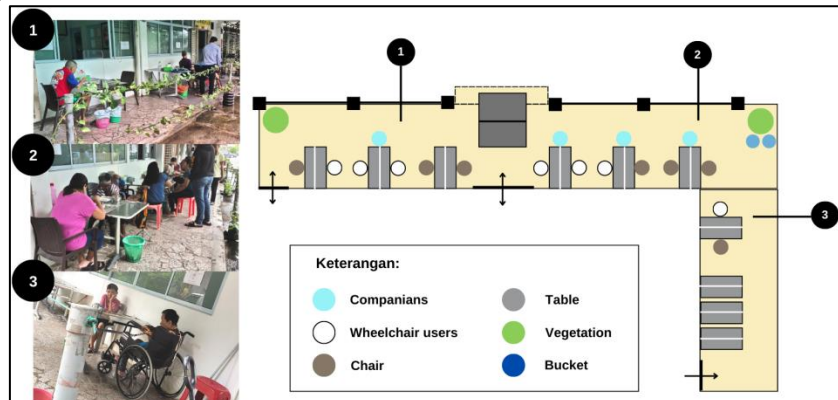


Figure 21. Outdoor Layout at the Puri Kebajikan Nursing Home
Source: Author, 2022

3) Independence

At the Puri Kebajikan nursing home, several alternatives are carried out to motivate or encourage the elderly to carry out activities independently, such as providing coffee time equipment in the living room and installing handrails. In terms of the spatial pattern at the Puri Kebajikan nursing home, it can be seen that the living room is centrally located. So the provision of coffee time in the living room can attract the attention of the elderly and encourage them to carry out their coffee time needs by themselves when passing through the room. Apart from that, handrails and chairs are installed in the elderly toilet to make it easier for the elderly to access it safely and comfortably.

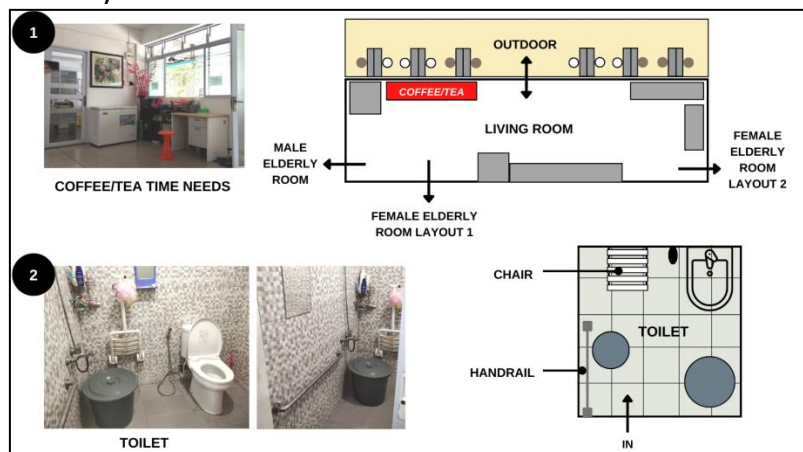


Figure 22. Layout of Providing Self-Reliance Alternatives at the Puri Kebajikan Nursing Home
Source: Author, 2022

4) Aspects of the Five Senses

Through the data collection process, it is known that most elderly in the nursing home have low sensory performance. So in the nursing home, alternatives are used

to help the performance of the five senses of the elderly in nursing homes. From Figure 23. it can be seen that many elements are applied to nursing home, but not all of them help the elderly properly.

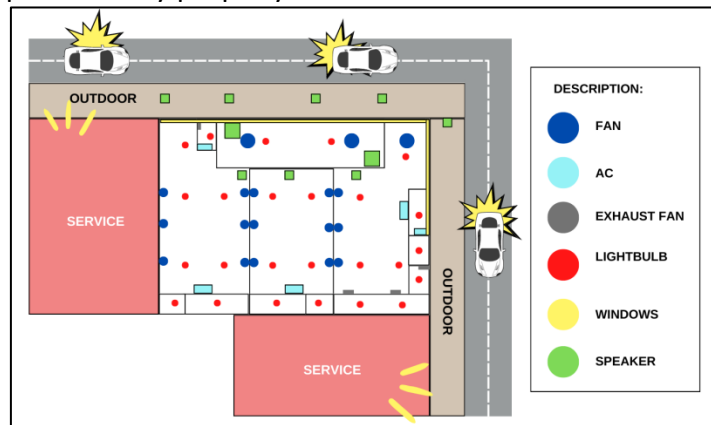


Figure 23. Layout of the Elements Forming the Aspects of the Five Senses in a Nursing Home
Source: Author, 2022

In facilitating hearing for the elderly in nursing homes, it can be seen that there is a speaker installed in each room which functions to convey information to the elderly when there is a sudden condition that can be heard by the elderly. In addition, the noise level at the nursing home is considered relatively high because even though the nursing home does not directly face the main road, vehicles still frequently pass through the road in front of the nursing home. In addition, the environment around the nursing home is surrounded by shophouses that open shops or service workshops, so they often produce noise that causes noise in the nursing home.



Figure 24. Installation of Speakers in Nursing Homes
Source: Author, 2022



Figure 25. Surroundings at the Puri Kebajikan Nursing Home
Source: Author, 2022

In terms of room temperature, externally, it also affects the five senses of the elderly. Therefore it can be seen that at the nursing home, efforts are being made to stabilize room temperature by installing fans and air conditioners in every room, especially in the elderly's rooms. In elderly rooms, it can be seen that there is an installation of an air conditioner and fan on each side elderly mattress that is mounted on the wall of the room based on the number of elderly living in the room so that the elderly do not overheat quickly. From there, it can be seen that the air temperature in the elderly's room is high, so it requires much artificial ventilation to stabilize the air temperature in the room. Besides, the elderly rooms also provide air filters in each elderly room and exhaust fans so that the air in the room is always replaced with fresh air.



Figure 26. Artificial ventilation in an elderly room

Source: Author, 2022

In the outdoor area, there is still no installation of artificial ventilation, and they are still utilizing natural ventilation. However, based on information from the staff, there is alternative planting vegetation in front of the nursing home, which helps reduce high temperatures when the elderly are active outside the room. In the outdoor area, you can also see the installation of curtains so that when it rains or hot weather, the elderly who are outside can still feel comfortable and not overheat.



Figure 27. Planting Vegetation and Installing Curtains Outdoors

Source: Author, 2022

Regarding lighting, considering that the elderly's eyesight is decreasing, lighting with high intensity is certainly not comfortable for the eyes of the elderly. However, at the Puri Kebajikan nursing home, it was found that there was the use of artificial lighting in the form of installing light bulbs which were considered unsuitable for the elderly because of the type of lamp. The lighting focuses directly on the room (direct lighting), and of course, it will be too dazzling for the eyes of the elderly. However, daylighting can also produce uncomfortable solar glare and very high luminance reflections on display screens, which interfere with elderly vision too (Ruck, 2000)(Fuller, 2013). So, therefore, it found that on each side of the walls of the nursing home, there are windows applied with sandblasting stickers to reduce the intensity of sunlight reflection on display windows from entering the elderly's room.



Figure 28. Lights and Exhaust Fan in the Elderly Room
Source: Author, 2022



Figure 29. Display of Openings at the Puri Kebajikan Nursing Home
Source: Author, 2022

In addition, considering that the elderly's eyesight is decreasing, helping the movement of the elderly while in the nursing home, it seems that there are alternatives to helping the elderly know the boundaries of the room through touch by applying different material textures to the floor surface of the room. Through the touch of elderly feet, they can feel an increase in leveling and a sign that there is room after passing through the different textures. In the outdoor area leading to the living room, it can be seen that there are three different materials used to help the elderly know if there is a slope or a sign of entry into the nursing home. In the elderly's room, they are also applying different material textures to notify the elderly that there is an increase in leveling and also for the elderly to know that the toilet is right after the texture of the floor.

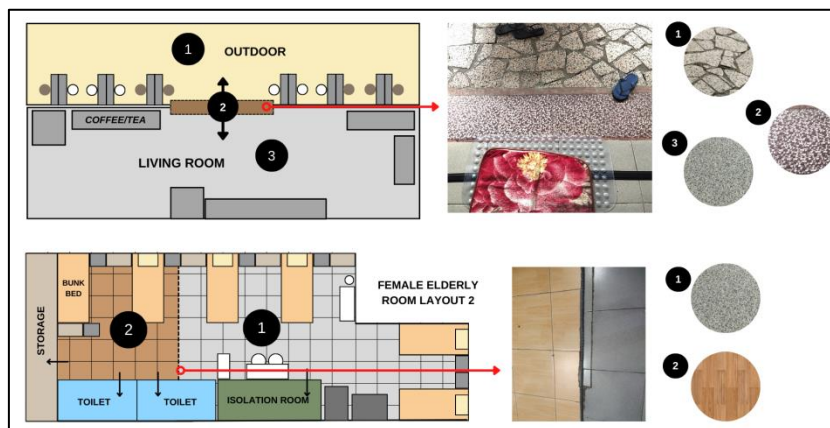


Figure 30. Layout of Material Texture Differences at the Puri Kebajikan Nursing Home
Source: Author, 2022

The author also suggests several alternatives for the Puri Kebajikan nursing home. First, artificial lighting in the room can use lamps whose lighting illuminates the room evenly or is not directly reflected into the room (indirect lighting), as seen in Figure 31. to make it easier for the elderly to see.

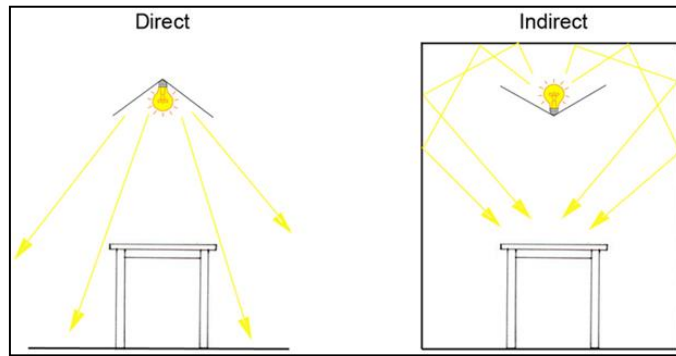


Figure 31. Comparison of Direct Lights and Indirect Lights

Source: Google, 2022

In increasing safety and convenience for the elderly in outdoor activities, handrails can also be installed in the outdoor area as a means for the elderly to access the outdoor area.

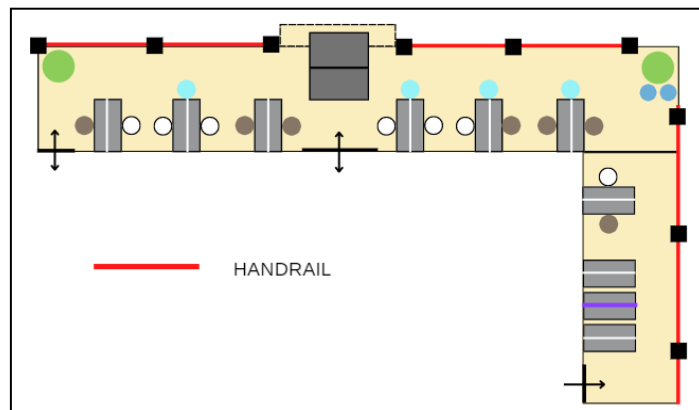


Figure 32. Handrail Installation Layout in the Outdoor Area of the Nursing Home

Source: Author, 2022

Alternatively, the male elderly door room can change the application of a door that was initially parallel to the management room became parallel to the female elderly room because many maneuvers happen to make it difficult for elderly wheelchair users to enter the room.

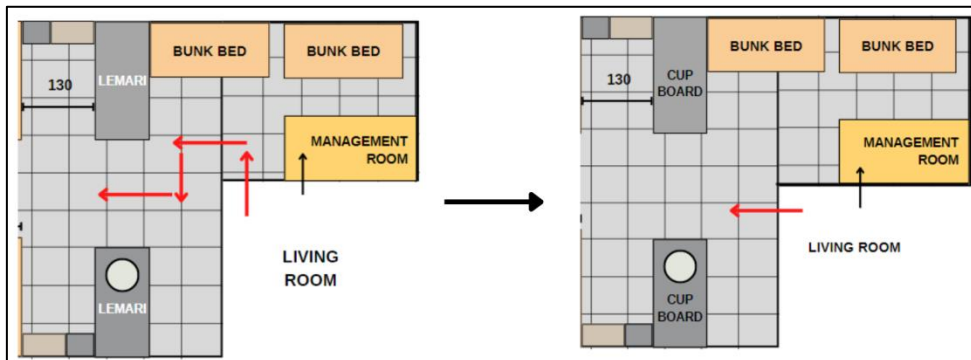


Figure 33. Access to the Elderly Men's Room at the Puri Kebajikan Nursing Home

Source: Author, 2022

To increase privacy between the elderly when in the same room, it is recommended to be able to apply cloth curtains for each elderly bed so that when the elderly do not want to be disturbed, they can close the curtains themselves.

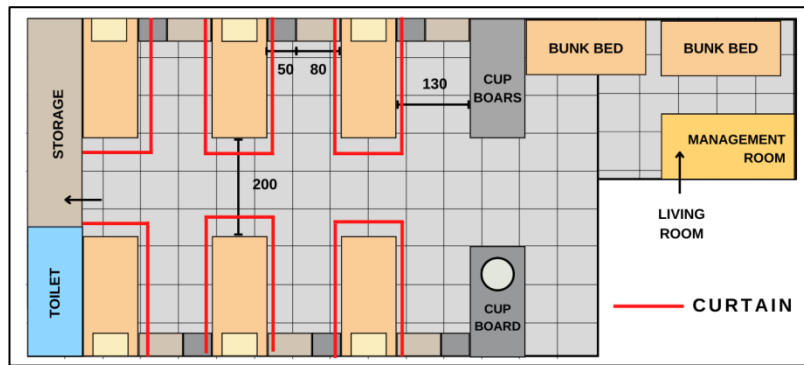


Figure 34. Application of Curtains in Elderly Rooms

Source: Author, 2022



Figure 35. Example of Curtain Installation

Source: Google, 2022

CONCLUSION

From the analysis and discussion results of the factors that shape the behavior of the elderly and the design principles of the Puri Kebajikan nursing home in Batam City, it can be concluded that the standards of the nursing home are considered "adequate" in the design criteria and adjustments to the behavior of the elderly. The Puri Kebajikan nursing home has met several criteria from the factors forming the behavior of the elderly in terms of space in the nursing home, dimensions and shape, furniture and arrangement, and use of color. However, the principles applied in designing nursing homes still need to be improved from physiological matters, which include the safety of the elderly, the environmental atmosphere created to suit the elderly, consideration of accessibility for the elderly, and meeting the needs of the elderly facilities.

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