

## *Designing the Interior of a Nursing Home for the Elders of Mauritius*

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The Asian Conference on Aging & Gerontology 2017  
Official Conference Proceedings

### **Abstract**

The phenomenon of population ageing is occurring in Mauritius, this is due to the progressive ageing of the median age itself. The demographic changes in the social and family structure have altered so drastically in the last decade; the extended family structure has disappeared to be replaced by the nuclear family. Since then there have been an increasing demand to provide the elderly people in Mauritius with a good residential. The first part of this research explains the usability, healthcare and safety problems occurring in the interior environment of old age homes in Mauritius. The aim was to understand the different needs of the elders from several cultural and religious backgrounds and design the interior of an old age home according to it. The aspect of design, colour and sustainability were explored and applied in the design process of the nursing home, focusing on all basic facilities such as a good environment, recreation, yoga and prayer room, green areas, well ventilated areas, lightings and others. Moreover, the colour preferences of elders were investigated to study how ageing affects colour vision due to many eyes diseases associated with old age. The data that has been yielded during this study was conducted by interviewing elderly people from different nursing homes. Five sample boards were prepared and presented to the residents of the homes. Based on the results obtained, a colour palette was made to design the interior of the nursing home.

Keyword: Ageing population, design and colour, colour vision, sustainable design, Mauritius.

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## **Introduction**

Mauritius is a multi-cultural society where the nursing homes accommodates residents from all type of religions. Mauritius has more than 20 old age homes across the Island and most of them were built years ago but some are modern and recently built with high standards. The phenomenon of population ageing is occurring in Mauritius as well and in the future the number of median age is expected to keep on increasing. The ageing trend is projected to increase because of the prolonged existence of humans and lower fertility levels. On average, a man and woman were expected to live up to 61 and 66 years respectively in the 1970's whereas in 2015 it is predicted that man to live up to 71 and woman up to 78 years. In the article on Population and vital Statistics Republic of Mauritius (Anon, 2016, p.11) it concluded that elderly people are the fastest growing age group. Eventually, in the future it is expected to have an increased older people and the government of Mauritius will have to build more residential for them. Therefore, it is needed to construct homes that are aesthetic and sustainable with a calm atmosphere for the older residents.

Before the dawn of the industrial revolution, elderly care was the responsibility of the family itself who would take care of older relatives. Also, individuals who were alone could depend on helpers only if they had incomes, and for poor individuals they were taken to local almshouses<sup>1</sup>. In the beginning of the nineteenth century, the first homes for older age were established by women's and churches groups, providing food for single women and widows. In addition, homes such as the Home for Aged Women in Boston (1850) and in Philadelphia the Indigent Widows' and Single Women's Society were considered a better place than the local almshouses, (US Legal,Anon, 2016) In the twenty-first century, nursing home care became a standard way to provide care for older aged and disabled people. Almost 6% of the elders were housed within the residential facilities along side with the ample range of care. (FATE Foundation Aiding the Elderly, p.1) In Mauritius, the oldest residential home is the Hospice Saint Jean De Deau which is situated at Pamplemousses. In 1856, a hospital was opened for the poor people by the new Mauritian congregation due to the epidemics in the capital Port-Louis. Later in 1947, the hospital was transformed into a hospice for older men, which is now known as the Hopice Saint Jean De Deau (Curia, 2011). Currently in Mauritius, the number of homes has increased and more facilities are being provided.

## **Colour Perception and Old Age**

Ageing is the main reason which leads to visual colour decline and it can also be caused by diseases like diabetes or smoking and genetics. As has been argued by Schneck, Haegerstrom-Portnoy, Lott , Brabyn (2014, p.289) the lens of human eye happens to be thicker due to its yellowing which diminishes the elder's ability to distinguish various hues. It is said that the human lenses starts yellowing at birth itself but the changes are slow and are hardly noticeable for years (Kitty Shea, 2017). According to Schneck et al.(2014, p.290) old age people cannot differentiate between pale colours of the blue-green section and other pale colors of the spectrum. Consequently, the colour red, orange, and yellow are easily differentiated than green and blue because of the yellowing of the lens. (Sherwin-Williams ; Kitty Shea, 2017). In Mauritius the yellowing of the lenses is one of the main causes of abnormal colour

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<sup>1</sup> Almshouses are: Houses built by organisation or a charitable person for poor people to inhabit in.

vision of the elders. In fact, the yellowing of the eyes is a normal ageing process and not a disease in older age.



Figure 1: Normal vision and yellowed vision (Peregrine eye and laser institute, 2015)

The three well known eye diseases that elders get are: Cataract, Dementia, and macular degeneration. In Mauritius Island, most of the older age people have the cataract eye disease, glaucoma (due to diabetes mellitus or sugar diabetes), diabetic retinopathy and dementia, a symptom of Alzheimer's disease [AD].

### **Colour and Emotion**

As Eiseman (2000, p.15) has argued "Our culture backgrounds and traditions influences our learned response and reaction to color as well." All over the world, the way of viewing colour and its meaning varies vividly through different cultures. For example, the colour blue has different meaning around the world. In general, blue is said to be the safest colour and has many positive associations. "Each culture has its own unique heritage of color symbolism..." (Eiseman, 2000, p.15). Mauritius being a multicultural society, colours have different meaning according to the different languages, religions and cultures that co-exist within a single community. When dealing with a particular cultural group of people, it is important to research on their perception of colour because not all people have similar reaction to colour (Eiseman, 2000, p.15). The nursing home care of Mauritius dwells in people from different religions mainly Hinduism, Buddhism, Christianity and Islam. Therefore, it is important to take colour into consideration while designing a home, for the elders to adapt to the surroundings.

### **Colour and Space**

According to Dorosz and Watson (2011), space is defined by form and in architecture space defines the people that will live in it. Modern spaces are generally open which exposes the materials used in the structure. Modern architectural nursing home enlarges individual space and makes each element of the structure disability-friendly. These attributes of disability-friendly should be implemented to every part of the nursing interior design, from the building to the layout of common spaces and rooms. A disability-friendly structure allows enough space to have room for medical devices, activities and wheelchairs.

## Healing Colours

Healing colours in residential home are highly recommended because it helps solves problems like depression and loneliness as well as give the residents a homier feel. The use of cool colours that are calm from the blues or blue-greens make the residents feel at ease with a more pleasing atmosphere. The space can be balanced with cool colours and some warm colours, also by using neutrals like beiges, which gives a sense of tranquility. What is more, traditional colours can be used to make the elders feel at home.

According to Roden (2013), the environment press model is the "forces in the environment that together with individual need, evoke a response." The environment press model was used in this research, it is all about the outcomes of the interaction that occurs between a person and its environment. The EP model can help a designer to know what types of environment changes is suitable to match the needs and abilities of the resident.

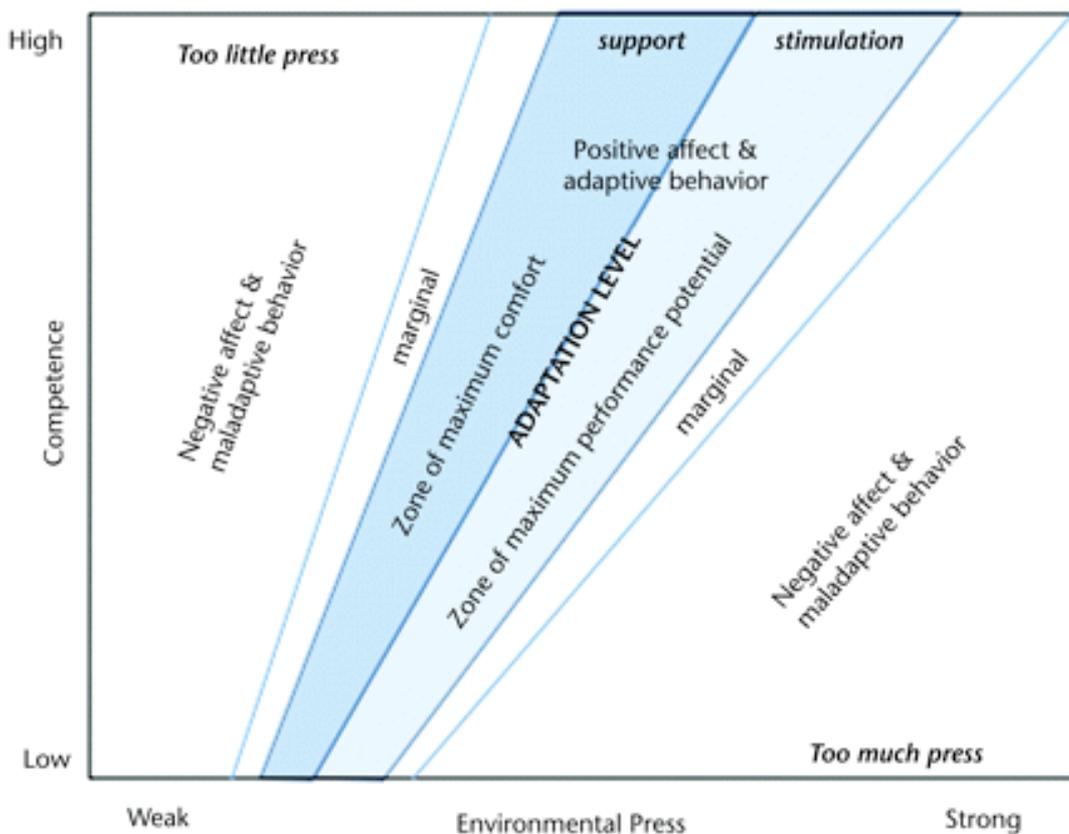


Figure 2: Environmental Press (Roden.P, 2013)

The above figure 2, is an EP graph where the Y-axis shows an individual's competencies which is an outcomes of their sensory or perception, functional, cognitive, behavioral skills, and social abilities. While the X-axis presents the quantity of EP or how good is their current environment according to their abilities (Roden, 2013).

## Concept

The environment within Mauritius consists of typically tropical area with coastal regions and forest in the mountainous region (Wikipedia, 2017). Mauritius has a tropical climate with clear sea water, beautiful beaches, fauna and flora and a multi-cultural populace. The houses in Mauritius still have that touch of French colonial style and farmhouse style. Therefore, to make the nursing home care feel homier and safer the French colonial and farmhouse styles are implemented along with the dementia concept. The dementia style is based on colour contrast which helps the dementia patient to perceive different colours.

## Methods

To analyse the colour scheme preferences of the older adults in their environments, alternative sample boards have been made. The five sample boards are of different colour palette including different samples of tiles, wall paint, curtains, cushions, and existing pictures of nursing home's interior. Research was done on healing colours before mounting the boards and four of the boards are cool colours with some warm colours while the remaining one is made up of brighter colours of red, yellow and green. Figure 3 and 4 are pictures of the sample boards.



Figure 3: Sample Boards



## **Observation**

The observation was carried out through a checklist, consisting of bedrooms, terrace, living room and dining room as well as the items in those places. These were the spaces where observation was allowed to be carried out. In different spaces each item and its colour was noted down. Accordingly, the observation has the outcome that the use of colours in the nursing home was a standard white colour in all the interior spaces. Significantly, this is not the right way to design a place for dementia or cataract patients.

## **Interview**

The second step was the interview which was done with each resident individually and also with the care taker. The number of residents interviewed was a total of 48 and the time allocated for one resident was 5 to 10 minutes depending on the residents' capacity to respond. At the Krishnanand Seva Ashram 38 residents were interviewed and the rest 10 residents were from the Maharana Pratap Ashram. The interview was conducted during the morning; from 10:00 to 12:00 to the convenience of the home so as not to coincide with breakfast and lunch time. The collection of data was done in the month of November 2016. The structured interviews were carried out with mostly open ended questions than close ended questions. The questions were translated in creole language when interviewing as the elders had difficulty to understand. When the residents were answering the questions, maximum information were collected and noted. Also there were colour preference questions that were asked like if they preferred brighter or soft colours.

Moreover, one caregiver from each ashram was interviewed on different usability problems that the residents faced at the ashram. In answering the question number 1 and 2, it gave a clear description of what types of problems the elders faced in the nursing home. The questions are about the different types of diseases and most prominently how the nurses help improve and maintain quality of life. It is about how they manage the daily activities to improve the health of the elders. The other question number 3 and 4, are about the type of environment the elders lives in and whether it influences them in any way. Furthermore, they were asked if the elders were able to adapt to the new life style and interact with their environment.

## **Colour palette**

The colour palette as shown in figure 5, 6 and 7 for the proposed ideas was derived from the results obtained from the survey. Some of the colours were used in different tones to create contrast in the space. This would help to produce a pleasing environment for the dementia patients.

COLOUR PALETTE						
BEDROOM						
	EMERALD	PALE PEAR	DARK GREY	GINGER	DARK CHEERY	WHITE
LIVING ROOM						
	PUNCH	DARK PEAR	GREY	RAW UMBER	DARK GREY GREEN	WHITE
DINING ROOM						
	PUNCH	TURQUIOSE	BLUE GREY	RAW UMBER	DARK GREY	WHITE
KITCHEN						
	MOSS	PALE PEAR	BLUE GREY	RAW UMBER	DARK CHEERY	WHITE

Figure 5: Colour palette for proposal one

COLOUR PALETTE						
BEDROOM						
	SAPPHIRE	ROSYBROWN	BLUE GREY	PAPAYA	KHAKI	WHITE
LIVING ROOM						
	PAPAYA	KHAKI	GREY	RAW UMBER	BROWN	WHITE
DINING ROOM						
	KHAKI	TURQUIOSE	PALE BROWN	RAW UMBER	DARK GREY	WHITE
KITCHEN						
	PALE BROWN	BLUE GREY	DARK GREY	RAW UMBER	DARK CHEERY	WHITE

Figure 6: Colour palette for proposal two

COLOUR PALETTE						
BEDROOM						
	DARK PEAR	PAPAYA	DARK GREY	GRAY	KHAKI	WHITE
LIVING ROOM						
	SEAGREEN	DARK RUBY	BLUE GREY	APPLE	WALNUT	KHAKI
DINING ROOM						
	MONARCH	TURQUIOSE	DARK CYAN	RAW UMBER	DARK GREY	WHITE
KITCHEN						
	SEAGREEN	PALE BROWN	BLUE GREY	CEDAR	WALNUT	MONARCH

Figure 7: Colour palette for proposal three

The architectural floor plan in figure 8 shows the dimension which specifies the wall lengths and the sizes of each areas of the nursing home. It also shows the relationship between spaces, room and other features from a top view.

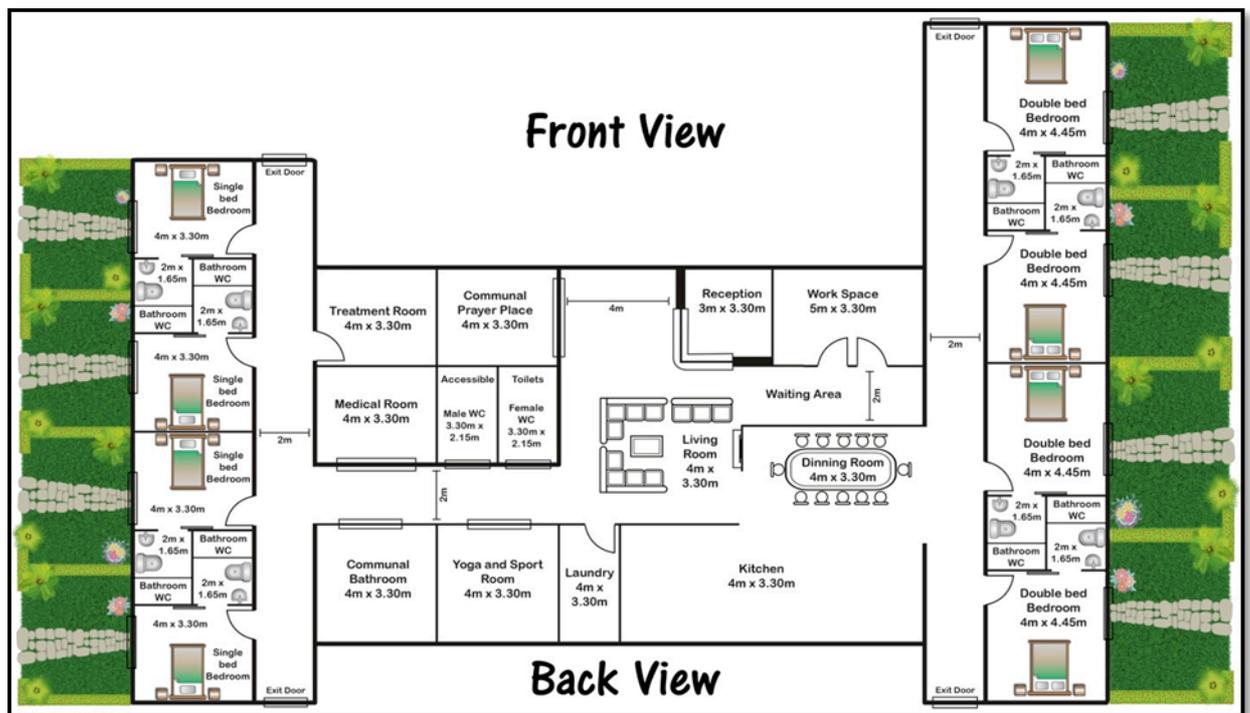


Figure 8: Architectural Floor Plan

### Proposed ideas

To design the home care a specific type of nursing home were chosen which is known as the Green House Model. Green house home is an innovative model for elder's

residential home architectural design. The green house project accommodates a group of 10 to 15 people which lives in houses that are designed to increase communication and contact between seniors and staffs. These types of homes provide a living room, an open kitchen, a family style dining area, an office, a sport and yoga room, and private bedrooms with toilet and shower as well as opened with a terrace. The design layouts were created in Google Sketchup which is a 3 Dimensional CAD design software and the layouts were rendered through the V-ray which is a plug-in for 3D graphic software.

These designs as illustrated in figures 9 to 14 represent a natural type of atmosphere with its relaxing colours and also specific design features that are applied to have a better environment. The flooring is of contrasting colour to the furniture and walls so as to allow the dementia people to see clearly their environment. Furthermore, ample circulation space is provided for the use of wheelchair and there is no use of rugs to reduce the possibility of falls and trips. Mostly all the furniture is made up of wood, as furniture with glass should be avoided for safety hazards. In addition, sharp edges on the tables are avoided instead curve-edged tables are better for the elder's security. It is essential to include personal and family objects in the space to encourage reminiscence of the residents. To help the elders recollect memories, photo frames were put on the wall which contained their own pictures.

Also to make the room evenly and adequately lit, wall lamps were used to reduce shadows. The use of diverse texture creates a sensory variation to the space, for the residents to easily differentiate between different objects. The curtains were of contrasting colours and with plain design. The white curtain was used to allow maximum light to enter the room during the day. Moreover, the installation of handrails is a simple measure to diminish the chances of falling. The handrails are mainly installed in the corridors, bathroom and staircases. A special table is designed for the disabled residents where they do not have to shift from their wheelchair to the chair instead they can use their wheelchair itself at the table. Additionally, the floor-to-ceiling and skylight windows are implemented to make sure the interior space is well lit and bright. It allows maximum natural light to enter and also gives a natural outdoor view to the elders. The communal prayer room was designed for all the residents and the different cultures, traditions and religions were taken into consideration when designing the room.



Figure 9: Propose Idea One

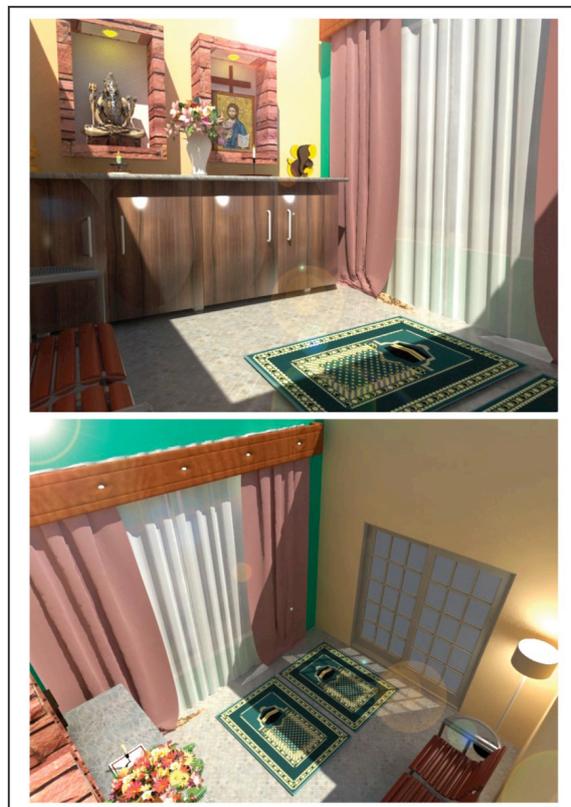


Figure 10: Prayer room of proposal one

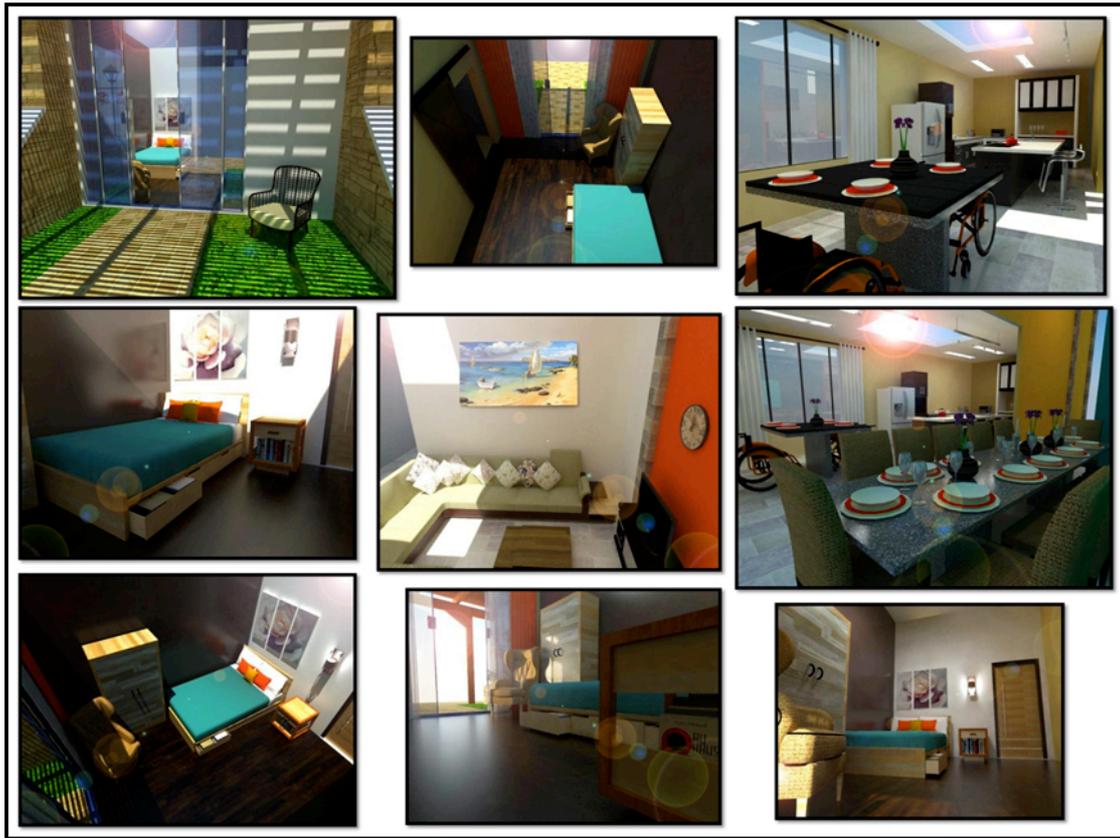


Figure 11: Propose idea two

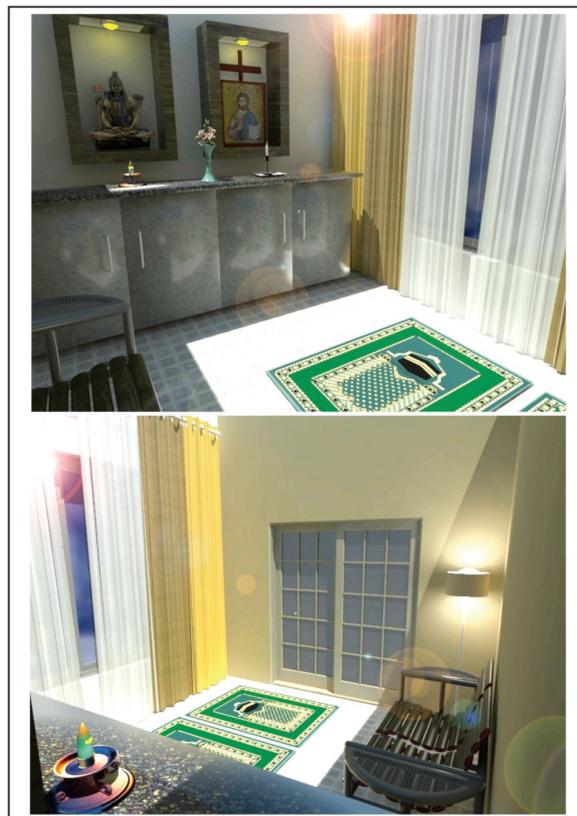


Figure 12: Prayer room of proposal two



Figure 13: Propose idea three



Figure 14: Prayer room of proposal three

## Results

### Analysis of the interview and survey

There were 48 residents who participated for the survey and the interview, who were above 50 years old. There were more male participants than female. In the Maharana Pratap Ashram, there were 70% female and 30% male of the total residents (10 people) who participated while in the Krishnanand Seva Ashram, there were 35% female and 65% male of the total residents (38 people). The residents have different age groups from 50 to 90 years old. The bar chart in figure 15 shows the different age group of the residents who participated. It can be noted that most of the residents are aged around 60 to 69 years old. This is the peak age where elders get all types of diseases which eventually affect them.

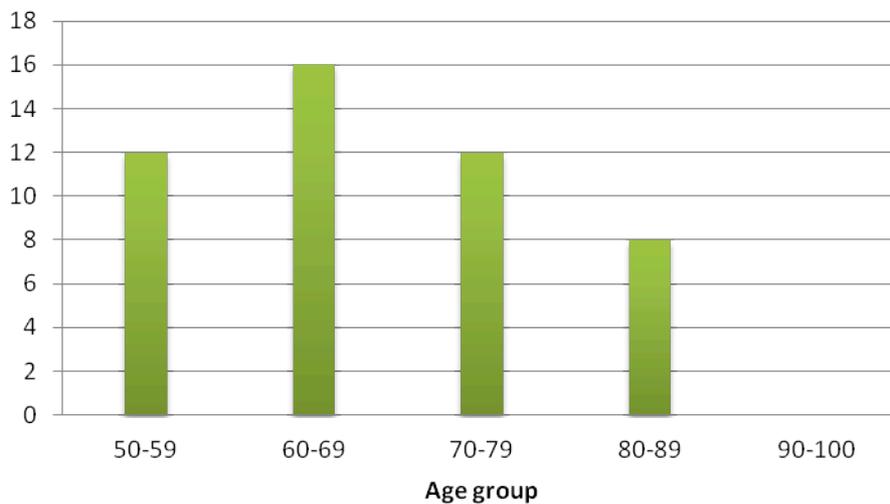


Figure 15: Bar chart representing the different age group of the residents

### Analysis of the Observation Checklist Table

Figures 16 and 17 represents the checklist tables for both the nursing homes and they consist of the variety of colours that are used in the ashrams. Significantly, in both the homes that have been visited it can be seen in the tables (figures 16 & 17) that the Maharana Pratap Ashram uses in majority the colour white. In any of the home's area it is applied on almost all the surfaces despite its functional and aesthetical aspects. Ultimately, having white lighting, chair, wall and flooring can create confusion for the elders. It is anticipated that, the brown colour door and grey railing stands out because of its contrast with the white colour. Therefore, the doors and handrails are easily perceived by the residents. Yet, it is more confusing with a space having the colour white in majority for the elders. Krishnanand Seva Ashram has the colonial style with bricks in the exterior of the home. It has a colour scheme of beige, pale orange, white, brown and yellow that creates some colour contrast in the environment. This helps the residents to see the difference between objects through its colour contrast.

	Living Room	Dining Room	Bedroom	Outdoor (terrace)
Walls	White	White	White	White
Lightings	White	White	White	White
Flooring	Black and White	Black and White	Black and White	
Ceiling	White	White	White	
Chairs/Seats	Black sofa	White Chair		White Chair
Desks/Tables	Brown Table	White table with brown table cloth		
Curtains			Beige	
Shelves	Brown		Brown cupboard	
Railing	Grey	Grey		
Door	Brown	Brown	Brown	White
Windows			White	White
Furniture	Brown	Brown	Brown	
Others				

Figure 16: Colour checklist table (Maharana Pratap Ashram)

	Living Room	Dining Room	Bedroom	Outdoor (terrace)
Walls	Pale orange	White	White	Grey Brick
Lightings	White	White	White	
Flooring	Beige	Beige	Beige	
Ceiling	Brown Wood	White	White	
Chairs/Seats	White Chair	White and Grey Chair		White Chair
Desks/Tables	Brown Table	Beige		
Curtains			Beige	
Shelves	Brown			
Railing	Grey	Grey		
Door	Brown	White	White	White
Windows			Yellow	Yellow
Furniture		White		
Others				

Figure 17: Colour checklist table (Kishnanand Seva Ashram)

### Data analysis of the interview (residents)

The bar chart in figure 18 demonstrates the colour preferences of the questions asked to the residents during the interview. The question was which colour is their favourite and there were many colours which were named. Then the data was analysed and they were arranged into three groups that are warm colours ; cool colours ; warm and cool colours. The data below shows that most of them prefer warm colour and most of them were red, orange or black. More detailed studies show that elders have problem to view colour specially colours on the blue-green range of wavelength.

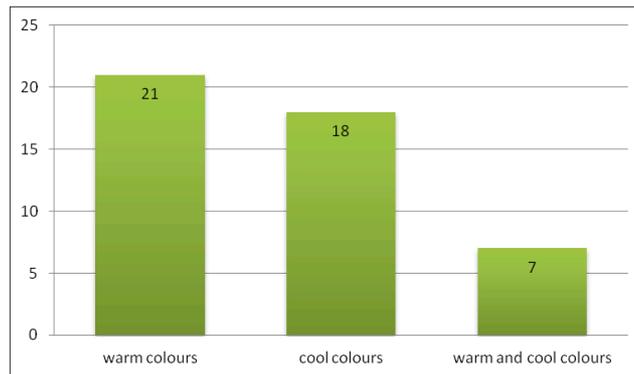


Figure 18: Bar charts for colour preferences

The bar chart in figure 19 shows the different activities performed by the elders in the home. From the result of the bar chart (figure 19), it can be seen that most of the elders preferred to play indoor and outdoor games or watching TV compare to the other activities. This in turn means that, the elders prefer to spend time together by watching the TV or playing games jointly to avoid loneliness and depression. More than 50% of the total residents who participated said that they like their environment as it creates an atmosphere of being at home. There were only 25% of the total residents who have a preference for activities like reading and gardening and all of them were aged between 50 to 60 years old. Therefore, it can be examined that this 25% of the residents do not have any eye problems or physical disabilities whereas the rest have different types of eye diseases mainly cataract and dementia or physical disabilities. Partly for this reasons, they said they could not read and do activities like gardening.

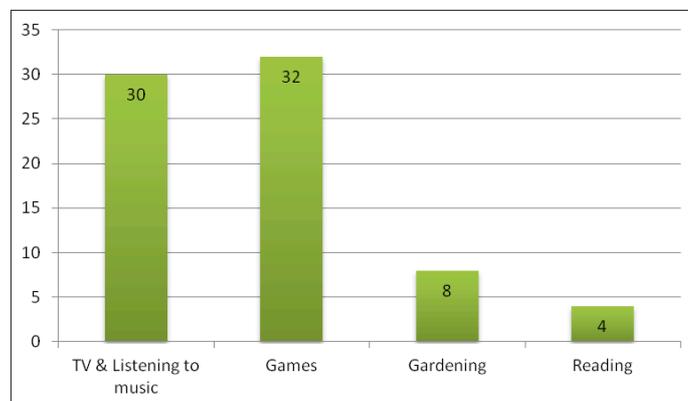


Figure 19: Bar chart representing the different activities

### **Data analysis of the interview (nursing home's nurses)**

Data collection was done through a continuous interaction with the nurses and the answers were noted down. The interview was about the health of the elders according to their environment, in which they were asked about their experiences and views they had when working in a home. The study revealed that many of the residents feels lonely and depressed in their environment. When the nurses were questioned about how the elders behaved, it came into sight that most of them are living alone in their own world with lesser communication whereas some enjoyed the togetherness of others. Lots of the elders have been ill or have had a bad experience as well as their present situations are terrible because they have no family member or friends to visit them. While, some of them are mentally strong, having a good health and they are still able to good take care of themselves.

It has also been evaluated that residents who are dependent on others due to their physical impairments, tend to affect their own dignity as they view themselves as a burden to others. Consequently, residents are treated with respect and taking care of their privacy is very essential for dignity-conserving care.<sup>2</sup> This also shows that disable and AD patients are difficult to handle compare to the others. Both the interviews anticipated that, colour can affect the elders and implementing a certain colour can have an effect on the residents' behaviour and mood. The interviewee explained that the colour used in majority should be pleasing to see and that the flooring should be of neutral colour like grey or beige without any patterns to prevent confusion.

### **Analysis of the sample boards**

The pie chart in figure 20 demonstrates the sample boards colour preferences. The residents had to choose one sample board which they preferred the most. After the analysis of the data obtained, it was anticipated that most of the residents preferred the sample board 3 (refer to figure 3) which consists of both warm and cool colours. Accordingly, the most voted sample board was used to create the colour palettes for the proposed ideas. All the colours of the board were used in different tones and shades to have variety of contrasting colours. Warm colours in contrast with cool colours are easily noticeable by elders suffering from dementia and also help to maintain a balance in the space.

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<sup>2</sup> A new model created for the palliative care, which help the patients to feel esteemed and valued.

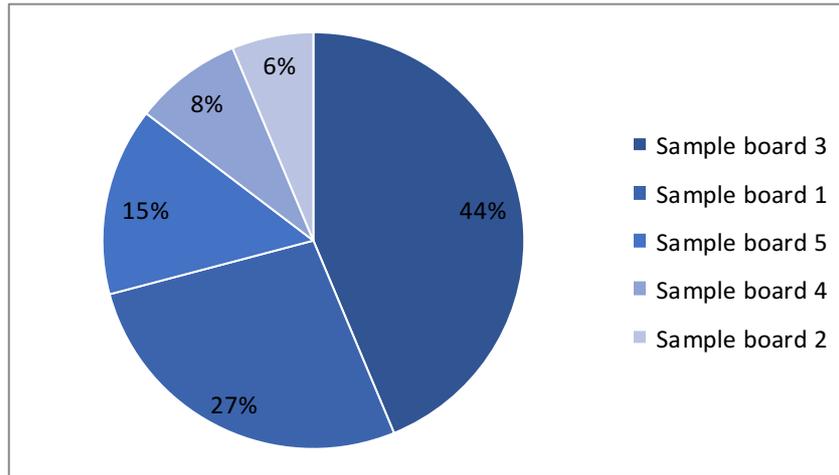


Figure 20: Pie chart representing the sample board colour preferences

### Analysis of the design proposal survey

A survey was carried out to know which type of designs the old age groups preferred and it was done with a questionnaire sheet. The information was gathered directly and they were asked to answer why they choose that particular design. The majority of the older adults have a preference for the design layout three (figure 21) as they find it simple and spacious with a colonial style to it. For them, it is the best proposal because of its colour schemes and cozy areas of the design. Unsurprisingly, this is because most of the elders like simple and ancient style houses that they live in now and will want to live in for the future nursing home.



Figure 19: Design layout 3 (The most preferred by older adults)

## **Discussion of findings**

Although diverse methods were used to gather all the findings throughout this research, there were common topics that came up. The staffs and residents are dissatisfied with the current situation (existing facilities) not only of the aesthetic reasons but also because they do not have appropriate functionality. Major issues were discovered such as lack of modern equipments for the homes. Based on the observation made, with the existing problems in the design, the facility is not available or not properly used by the staff. It was observed that exterior windows appeared unused in certain areas and many of the windows are either medium size or small. This can be viewed as an adverse misuse of the natural sunlight as there is no maximum use of the light. If the nursing home would be designed to have maximum privacy and a calm atmosphere with pleasing colour palettes, there would be much less depression and possibly more happy elders.

## **Conclusion and Recommendation**

This study has provided more insight on the experiences and views that older people have when living in a nursing home care. It was conducted to understand and show how design and colour of the environment affects the elders. Also, the colour preferences elders have on the different functions of a space. It has been foreseen that the application of colours in the nursing home environment are not done according to the colour scheme preferences of the elders for a specified area. The result of the data have been analysed to find how elders behave in a nursing home and what are the environment features that generates safety and usability problems for them. The findings showed that the environment of a nursing care can improve the mental and physical health of a resident if proper colour and design are applied.

The implications that have been drawn throughout this study is that there are certain factors that affect the residents in a home. The main reasons are the colour scheme, psychological colour preferences, colour vision deficiency and the designs of the space. Thus, what has been analysed from this study is that the green house model can improve the problems available in a home. This is a strong point that should be underscored and not to be overlooked. Furthermore, future research can be done on whether the green house home is better than the normal nursing home or not.

Maybe, the most important matter is that the green house model is an innovative vision of how a nursing home will be in the future. Alternatively, innovations in the green house home itself or any nursing home care may develop over time. At the end of the day, the goal is to provide Mauritian elders optimal nursing home care and for them to have a better quality of life in the residential.

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