The Influence of Colour Psychology in Creating a Healing Environment in Palliative Care Units

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***Abstract*— This study explores how color psychology can be used in palliative care facilities to create a more calming and supportive environment for patients. It is important to understand how colors can affect emotions and well-being, as patients in these units need compassionate care as they approach the end of their lives. The study reviews existing research on color psychology, emotional responses, and therapeutic environments. It aims to understand the psychological effects of different colors, identify colors that promote healing and emotional support, and evaluate the effectiveness of using color interventions in palliative care settings. The study uses a mixed-method approach, including case studies to assess emotional responses and color preferences, as well as focus groups and questionnaire surveys with patients, family members, and healthcare professionals. Participants' consent and privacy are protected while upholding ethical principles. Data analysis includes both statistical and thematic analysis techniques to identify patterns and trends in the data. The results of the study can be used to improve the comfort and well-being of patients and their families in palliative care facilities. Patients in palliative care units had different preferences for colors that they found comforting than those that were considered soothing in their environment. Palliative care patients preferred colors that reminded them of home, indicating a desire for familiar and comforting surroundings. A familiar and emotionally resonant environment can improve the mental and physical well-being of palliative care patients, helping them to cope with their medical challenges. It is challenging to create a fixed color scheme for palliative care patients, as their preferences can change based on their mental state. For example, choosing black might indicate hidden emotional distress. Integrating color psychology principles into the design and decoration of palliative care facilities can improve the quality of life for patients and their families.**

Keywords*— *palliative care unit, healing environment, color psychology

I. Introduction

This The Palliative Care Centre is a facility created to offer comfort and healing to terminally ill patients and their families. It can be demonstrated how useful this is for healthcare. Palliative care aims at early detection and prevention of their suffering in order to improve the quality of life for patients and diseases that endanger the lives of their families. Because the patient's mind is paralyzed, serious illnesses are stressful. Here, it helps to foster positive thinking and enhance the patient's and their family's quality of life. Doctors, nurses, and a professional team with specialized training work in the ICU wards. It can be made available for people of any age and at any stage of serious illness. as in other nations, increased life expectancy, a growing elderly population, rising rates of cancer and other incurable diseases are all contributing to a greater need for palliative care centers in Sri Lanka. Teaching Hospital Karapitiya Sri Lanka is providing this service in light of the increase, the need for it, and as part of its efforts to provide palliative care. This facility is the only comprehensive palliative care center in sri lanka. The goal of this study is to comprehend how colour psychology might help palliative care facilities foster a healing environment [1]. Health is influenced by environmental, psychological, social, and emotional factors, impacting both visitors and patients. Palliative care facilities face significant insecurity, dread, and uncertainty. Hospitalization is a defining experience, and patients and doctors view healthcare institutions differently. Color in healthcare facilities should consider physical and psychological factors [2]. considering patient health. Careful color schemes, including daylight hues and strong reflected lighting, are essential. Patients' perspectives on fear and stress change upon entering a hospital, and palliative care centers should consider users' emotional states when designing décor [3].

II. Research Problem and Methodology

A. Research Question

What kind of influence does color psychology have on the health and well–being of palliative care unit users by being in a healing environment?

Aims and objectives

1. To analyses the potential effects of different colors on the emotional state, comfort, and overall well-being of patients and their families in palliative care units.
2. To analyses the potential effects of different colors on the emotional state, comfort, and overall well-being of patients and their families in palliative care units.
3. To evaluate the perceptions and experiences of patients, families, and healthcare providers regarding the influence of color psychology in creating healing environments in palliative care units.
4. To provide recommendations and practical strategies for implementing color psychology principles effectively in palliative care unit design to enhance the well-being and comfort of patients and their families.

This research aims to explore the impact of color psychological combination on the wellbeing of palliative care patients and to establish a comfortable environment. The study will employ a mixed-methods approach, involving literature review, qualitative interviews with healthcare personnel, patients, and relatives, and quantitative data collection through surveys to explore the psychological

impacts of colors in palliative care and their relationship with healing outcomes. The research methodology involves qualitative information, case studies, and surveys with palliate care units' patients, doctors, and visitors to understand the influence of color psychology on creating a healing environment. Data was collected during site visits, data collection, and photography. Literature Survey, Case Studies, Questionnaire.

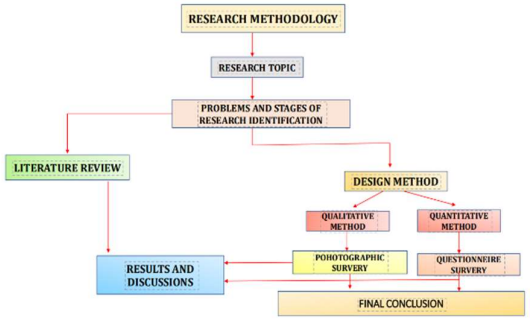

Fig. 1. Research methodology design by author

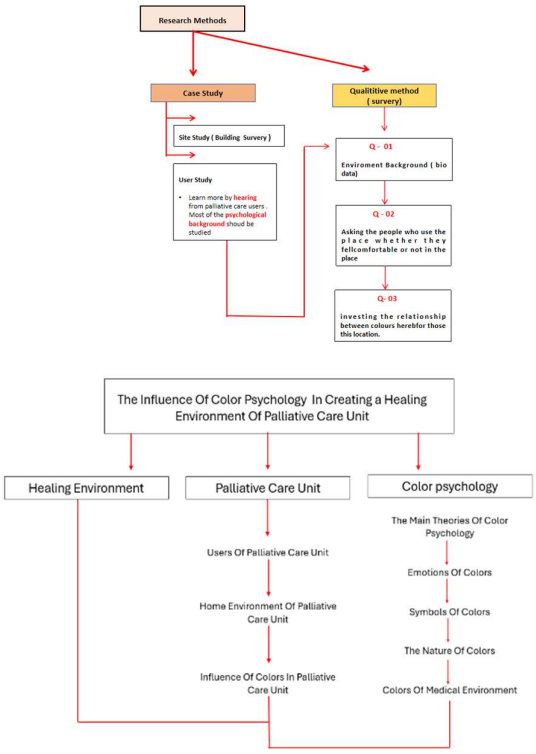

Fig. 2. Sample from each palliative unit's design by author

A. Research design

This study employs a mixed-method research approach to examine color psychology's role in creating a healing atmosphere in palliative care units, aiming to provide evidence for its integration in end-of-life care design.

B. Case Study & Photographic Survey

The case study focuses on patient and staff comfort, color relationships, and palliative care unit comfort. 13 patients from Mahar agama Cancer Hospital and 10 from Teaching Hospital Karapitiya were treated, with 26 staff members and 20 patients from both hospitals.

- Teaching Hospital, Karapitiya
- Apeksha Hospital, Maharagama

III. Literature Review

A. Healing Environment

Research suggests that healing, a psychologically beneficial outcome, can be applied to landscape and architectural design, particularly in the healing garden, and suggests future studies on its benefits [4]. Nature can be integrated into environmental design through immersion or visual access. Windows provide outdoor scenery and indoor gardens, while features like bird feeders and accessible patios enhance patient experience. This approach enhances patient satisfaction and satisfaction in institutional settings[5]. Participants rated a healing environment based on physical characteristics, emotions, familiarity, connection to nature, spiritual importance, and attentive staff, describing a peaceful, comforting atmosphere [6]. The concept of a homely setting, resembling family members and familiar spaces, was emphasized as a therapeutic environment with natural views. Participants described porch swings, backyard porches, and windows with forest views as healing spaces [7] . Participants linked healing places with spiritual connections, enjoying talking to the Lord, serving God, and receiving spiritual care. places for well-being enhancement [8]. Hospital settings are being transformed into therapeutic environments, focusing on emotions, sensations, and physical features, but some find the current settings impersonal and lacking connection [9]. Hospital staff's professionalism, family visits, and home-like atmosphere improved patient recovery. Relaxation, sleep, and comforting thoughts were key, with TV channels promoting these aspects [10].

B. Hospitalized patients Experience of the Healing Space

The study surveyed hospitalized patients about their healing experiences, focusing on the pathogenesis perspective. Participants transitioned from sickness to wellness, with some believing hospital staff needed to solve issues. However, few articulated healings beyond sickness settings from a spiritual or autogenic perspective, as per the SI [11].



Fig. 3. Healing Courtyard - Dominican Hospital Foundation



Fig. 4. Healing Courtyard - Dominican Hospital foundation



Fig. 5. Healing Throwth of Architeacture in Health Care

C. *Healing through architecture in health care by author*

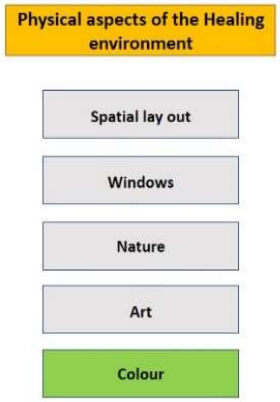

Fig. 6. Healing Through Architecture in Healthcare by Author

The "ambiance" of a place affects the individuals who use it. In order to lower stress and anxiety, boost patient happiness, and encourage health and recovery, healthcare environment design has started incorporating aesthetic improvements in recent years [12]. Proponents most frequently claim that the natural environment is naturally therapeutic or health-promoting. From just harmless to safe (physically and psychologically), to "providing a positive context" to actively, we propose a hierarchy of impacts of environmental factors [13]. For the purpose of developing design guidelines for the physical components of an ideal healing environment, the majority of pertinent research has focused on a small number of settings and is insufficient. There are chances to contribute significantly in this field, which is expected to have a big effect on people's health outcomes [14]. Healing environments create a sense of home for participants, allowing them to feel connected in unexpected settings. Patients often associate a healing environment with their own house, while others see it as impersonal and functional [15]. Patients perceive healing environments as promoting cognitive, physical, and spiritual well-being through visual associations, soothing distractions, and social relationships, suggesting a need for focus on social cohesion and healing relationships [16].

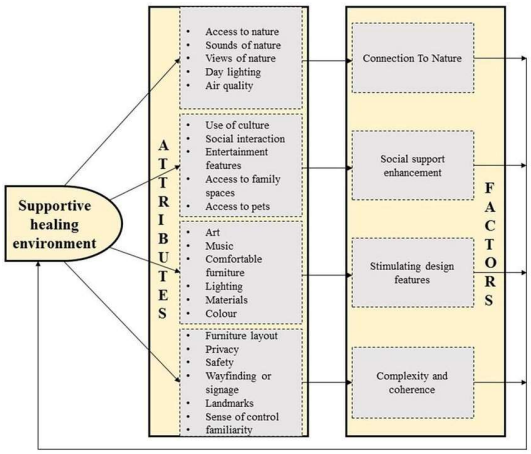

Fig. 7. Conceptual model of a supportive healing environment with the four attributes from Ulrich's and Dilani's theories.

A holistic approach to healing environments considers both physical and social factors, focusing on the interconnectedness of physical, psychological, spiritual, and behavioral components. An ideal environment supports healing and wholeness, with environmental factors impacting cognitive and emotional components, such as plant-based environments reducing anxiety [17]. The text explains various physical elements such as spatial layout, lighting, scent, nature, art, color, acoustic comfort, aesthetics, and ambient conditions.

D. *Spatial Layout*

Single-patient rooms offer patients safety, cleanliness, and reduced medical errors due to fewer individuals, fewer patients, family members, and staff. They also provide greater patient satisfaction by ensuring voice and visual privacy and confidentiality [18].

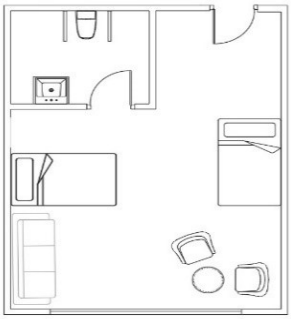

Fig. 8. Patients room Lay out design by author

E. *Windows*

Windows serve as ornaments for patients, allowing them to escape crowded or uncomfortable areas. Large windows with low parapets help patients look out onto sunny natural areas, reducing suffering and distracting their attention, thus reducing depression [19] .

F. Nature

Nature significantly contributes to a healing environment, and its use in hospitals can improve patient satisfaction. Utilizing natural colors, materials, and views through windows, projections, and technology can enhance the impact of nature on patient well-being [20].

TABLE I. OPTIMAL HEALING ENVIROMENTS

Internal	Interpersonal	Behavioral	External
Healing Intention	Healing relationships	Healthy Lifestyle	Healing Spaces
Personal Wholeness	Healing Organizations	Integrative Care	Ecological Resilience

Palliative care aims to lessen pain, prolong life, enhance quality of life, and support patients with terminal illnesses and their families. Doctors, nurses, social workers, spiritual counselors, and other necessary specialists provide integrated palliative care. After sick patients leave [21], palliative care will continue. Specifically, by emphasizing the provision of assistance to the families left behind Seven categories of palliative care activities are listed in the Palliative Care Policy: nurse care, pain management, treatment of other medical complaints, social support, psychological support, cultural and spiritual support, and assistance before and during times of loss [22]. Patient care and treatment units in palliative care institutions should cater to their individual, social, physical, and psychological needs. They require a balanced diet, comfortable bed, cleaning, care, love, and attention, as they may experience sadness and separation from families [23].

Palliative care is a form of responsive care that addresses the psychological, social, and spiritual issues of patients and their families, aiming to provide the best quality of life from diagnosis to end, focusing on pain relief, symptom reduction, and overall well-being.



Fig. 9. Palliative care concepts

G. Color phycology

Color plays a crucial role in human senses, biochemistry, and psychology, impacting community environment design. Understanding color psychology is essential for community health settings. However, there is limited scientific advice for color design in community environments, and a comprehensive color system is still in its infancy [24]. Color expresses diverse human emotions and observable phenomena, influencing psyche, physiology, and imagination through eye contact and influenced by psychological and physical situations [25].



Fig. 10. The effects youre paint colure has on youre mental and physical wellbeing

1. The main theories of color phycology

Colour theory explains that hues' meanings vary based on environment, society, age, and other factors, with approximately 7 million visible colours starting with fundamental building elements [26]. Red, Blue, and Yellow are the foundation colors for tones, while black is created by mixing these colors in an exact ratio. Secondary colors, such as violet, lime, lavender, purple, amber, and turquoise, are hues created by combining two main colors [27].

2. Emotions of colors

Color psychology research has provided a scientific basis for evaluating and producing colors in community health environments. Colors can convey visual information and emotions, allowing individuals to express various emotions and make impactful visual statements. This research has aroused imagination and memory, intensifying emotional resonance [28].

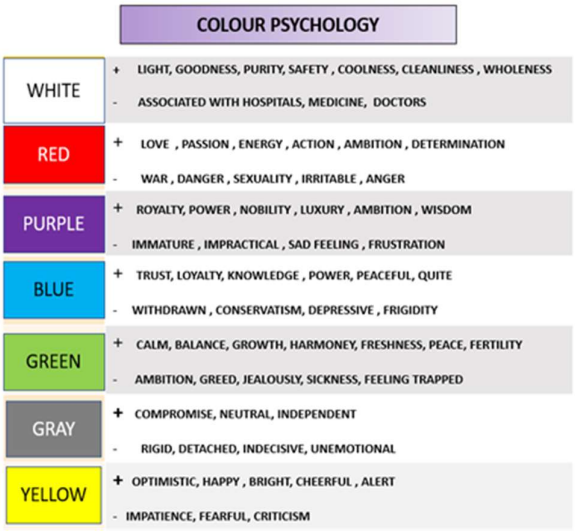

Fig. 11. Emotional effect of colors by author

3. Symbols of colors

The sign of color represents the conceptual spectrum of color, referring to the association between a color and associated objects. People from different backgrounds attribute symbolic meanings to colors, suggesting color symbolism is not just a historical and cultural form, but a symbolic form in society [29].

Colour	Emotional Effects of colour	
	Calmness, tranquility, trust	Linked to feelings of relaxation and stability.
	Growth, harmony, nature	Symbolizes renewal and balance found in the natural world.
	Creativity, luxury, spirituality	Represents a mix of calming blue and vibrant red.
	Earthiness, reliability, comfort	Evokes a sense of stability and connection to the earth.

Fig. 12. Symbolic meaning of colors by author.

4. Relationships between color and the mind

Pantone's article "How Does Color Affect Us?" highlights that color is light and energy, and exposure to certain colors can trigger physiological changes, stimulate, excite, depress, tranquilize, increase appetite, and create warmth or coolness [30]. John Gage's book Color, and Meaning: Art, Science, and Symbolism provides valuable insights into color associations and their connotations, despite the limited number of studies on color therapy and interaction [31].

H. Colors of medical environment

Research on colour use in hospital settings is contradictory, but consensus exists that hospitals should be welcoming, therapeutic, and support healing. Designers must consider functional and perceptual requirements for various user groups[32] . contradictory, but consensus exists that hospitals should be welcoming, therapeutic, and support healing. Designers must consider functional and perceptual requirements for various user groups[32].Research on color's physiological and psychological impacts in healthcare settings is often limited due to limited sample sizes and repeated studies, with some studies promoting green as a beneficial color for eyes [33].

I. Influence of colors in palliative care unit

Color, a significant natural element, can influence human behavior, either positively or negatively, depending on the amount of light and darkness. The color scheme in the waiting room enhances stress reduction and creates a visually relaxing atmosphere. Furniture, color, and lighting contribute to creating a friendly atmosphere, utilizing color in architecture in various ways. Color in public spaces should consider emotional and psychological factors, aiming to create a warm [34].

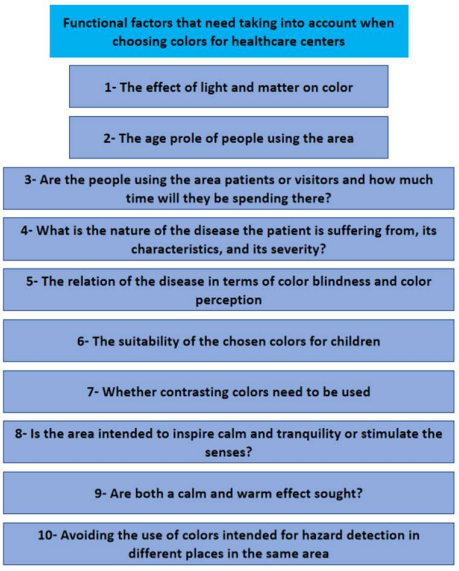

Fig. 13. Choosing colors for health care centers by author design

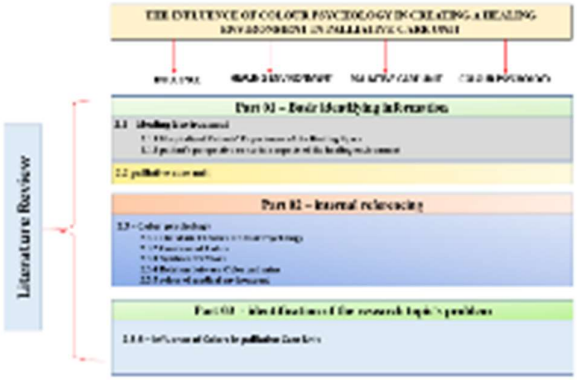

Fig. 14. Conclusion of the literature review

NAME	TEACHINH HOSPITAL KARAPITIYA	APEKSHA HOSPITAL MAHARAGAMA
PICTURE	Figure 9 - Teaching Hospital Karapitiya palliative care unit 	Figure 10 – Apeksha hospital maharagama 
LOCATION	Karapitiya , Galle – Sri lanaka 	Maharagama – Sri lanaka 
DESCRIPTION	A follow-up to a March 2020 item on the construction of the Karapitiya Palliative Care Centre has been sent to us. On June 13, 2020, Karapitiya Teaching Hospital's first palliative care center in Sri Lanka was inaugurated by consultant oncologist Dr. Krishantha Perera	The leading facility for cancer treatment in Sri Lanka is the National Cancer Institute (Apeksha Hospital).

Fig. 15. Case study basic information's by author

IV. Data Analysis and Discussions

A. *Case study I: Apeksha Hospital Mahar agama Palliative care unit*



Fig. 16. Apeksha Hospital Maharagama - palliative care unit by author



Fig. 17. Apeksha Hospital Maharagama - palliative care unit by author

A	Using for larger window Using for larger windows in palliative care units allows for more natural light to enter the space , creating a brighter and uplifting environment for patient . The increased access to natural light can positively impact patients moods . Reduce feelings of isolation , and promote a sense of connection with the outside world . Additionally , larger windows offer better views of the surroundings , which can be comforting and therapeutic for patients facing end of life care .
B	Natural sunlight and natural ventilation .
C	Lite color curtains – using white color curtains in palliative units creates a serene and peaceful environment , promoting a sense of tranquility and comfort for patients their families during their difficult journey . The purity and simplicity of white can also enhance the overall brightness of the space , contributing to a welcoming and soothing atmosphere .

Fig. 18. Apeksha Hospital Maharagama - palliative care unit by author

A	**Using the white color in walls - In palliative care facilities, using white for the walls promotes calmness and serenity, fostering a relaxing environment that can be comforting for patients receiving end-of-life care .**
B	**using for some indoor plants** – Indoor plants in palliative care nursing units improve well-being, reduce stress, and enhance indoor air quality for patients and families.
C	**White color finishing furniture** - Patients benefit from the relaxing environment created by furniture with a white color finish in Apeksha Hospital Maharagama palliative care units. White represents purity, tranquility, and peace, which helps create a quiet environment that can reduce stress and anxiety in patients receiving end-of-life care. White furniture can also create a feeling of openness and space, which benefits patients and their families during difficult times.
D	**natural ventilation and sun light**
E	**comfortable seating arrangement, Gray and white colure furniture using** Using a gray and white color combination for furniture in palliative care units creates a harmonious and soothing aesthetic that promotes a serene and calming atmosphere for patients and their families. The blend of these neutral colors can provide a sense of comfort and tranquility during challenging times, helping to improve the overall well-being of those in care

Fig. 19. Case study description by author

B. *Case Study II: Teaching hospital Karapitiya - Palliative care unit*



Fig. 20. Teaching hospital Karapitiya - palliative care unit by Author



Fig. 21. Case study description by author



Fig. 22. Apeksha Hospital Maharagama - palliative care unit by author

C. *Questioner Survey: Case 01 - Apeksha hospital Mahar agama*

A survey was conducted at Apeksha Hospital Mahar agama and Teaching Hospital Karapitiya to analyze patient responses to palliative care, considering factors like gender, age, duration of use, unit name, and occupation. The palliative care unit at Apeksha Hospital Mahar agama has been mostly used for at least 2-6 years. These estimates will vary from year to year depending on the available data.

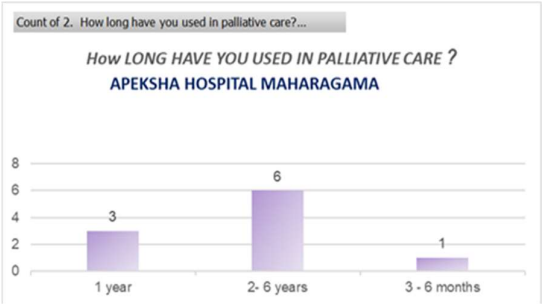

Fig. 23. Teaching hospital Karapitiya - palliative care unit by author

The demographic table shows that most patients at Apeksha hospital Mahar agama are married, with no distinction between married and unmarried individuals admitted to palliative care programs. The study explores the impact of environment on patients' perceptions of the palliative care unit at Mahar agama Hospital, finding that 8 patients preferred both noise and ambient light.

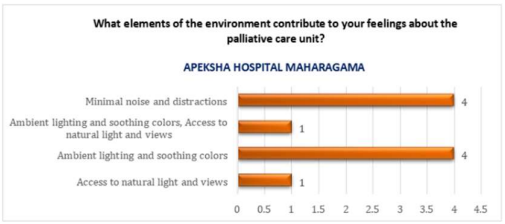

Fig. 24. Teaching hospital Karapitiya - palliative care unit By Author

What elements of the environment contribute to your feelings about the palliative care uni	Count
Access to natural light and views	1
Access to natural light and views	1
Access to natural light and views	1
Access to natural light and views	1
Access to natural light and views	1
Access to natural light and views	1
Access to natural light and views	1
Access to natural light and views	1
Access to natural light and views	1
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Access to natural light and views	1

Fig. 25. What elements of the environment contribute to your feelings about the palliative care unit by author

D. Relationship Between Colors in the Palliative Care Unit using for patients

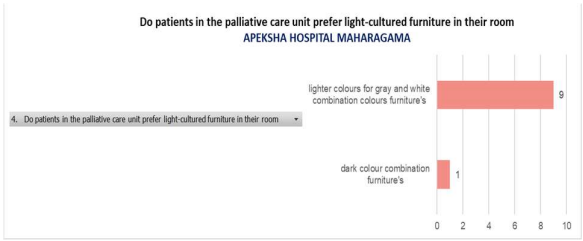

Fig. 26. Case study description by author

Patients in Apeksha Hospital Maharagama palliative care unit prefer slightly lighter colours, such as white and Gray, with a preference of 9.

E. Case 02: Teaching Hospital Karapitiya

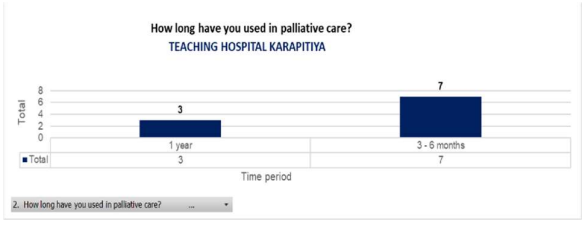

Fig. 27. How long have you used in palliative care unit by author

The palliative care unit at Teaching hospital Karapitiya has been mostly used for at least 3- 6 months. These estimates will vary from year to year depending on the available data.

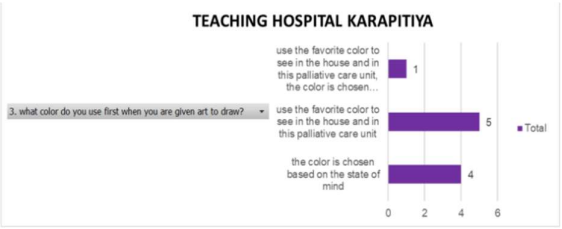

Fig. 28. How long have you used in palliative care unit by author

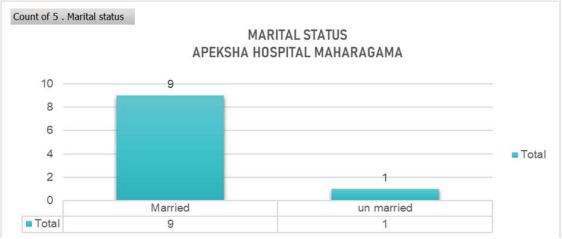

Fig. 29. What color do you use first when you are given art to draw by author

Patients at Teaching Hospital Karapitiya are asked to draw a picture using their home colours and mental levels, with 05 patients choosing their preferred colours and 04 patients choosing colours based on their mental level. Similarly, a questionnaire survey has been prepared for the medical staff.

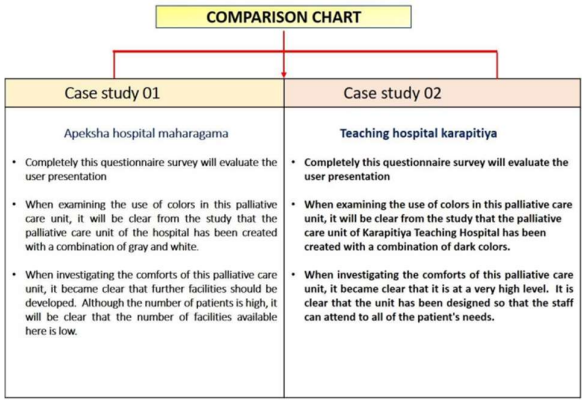

Fig. 30. Compression chart for case studies by author

V. CONCLUSION

The survey of palliative care patients revealed that they prefer colours that bring peace and comfort, improving their physical and mental conditions. However, a specific color scheme is not possible for patients of colour, as their mental levels change over time. For example, a patient with cancer may choose the first colour due to emotional distress, making it impossible to formulate a specific colour scheme for these patients.

A. Findings

- Patients in palliative care unit s favored different comforting colors than those deemed soothing in their environment.

- Palliative care patients preferred colors reminiscent of home, indicating a desire for familiar and comforting surroundings.
- A similar, emotionally resonant environment enhances mental and physical well – being for palliative care patients , addressing medical challenges .
- Creating fixed color scheme for palliative care patients is challenging due to their shifting preference based on mental Staes.
- Choosing black might signify hidden emotional distress, emphasizing difficulty in creating standardized color schemes for palliative care.

B. Recommendations

- Patient rooms in palliative care units need privacy, cheerful interiors, minimal furniture, and bedside placement near large windows for comfort and tranquility.
- Palliative care should employ light colors to uplift the mind, caution must be taken with darker hues impacts on emotions.

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