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Therapeutic Design- An Architectural Approach for Healing Invisible Injuries

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Abstract : According to human-environment studies, our specific living places have a significant influence on how we feel, behave, and cope in everyday life. Today, designers are leaning toward the concept that environmental alteration can be a feasible, long-term solution to certain of our medical, psychological, and emotional issues. It is essential that as designers, we build environments that allow people to thrive physically, mentally, and emotionally. When exposed to a favorable calming environment, the human body follows and permits the mechanism of 'self-healing.' Through design principles that inspire and stimulate the senses, should create experiences that persuade beauty and cultural integrity. Investigating sensory design and its ability to heal space and material, light and shadow, sound and texture are all intertwined in our daily lives. Through design principles that inspire and stimulate the senses, should create experiences that persuade beauty and cultural integrity. Investigating sensory design and its ability to heal space and material, light and shadow, sound and texture are all intertwined in our daily lives. Architecturally, some structures effect the brain positively creating a sense of calmness, including placements of windows, ceiling height can leave them with a sense of improved sensory response resulting in healing of the mental disorder. This paper aims to understand architectural environment for therapeutic healing. It focuses on how architectural variables may be managed and built to create a spatial environment that promotes patient recovery and well-being through Evidence based study, Phenomenology of Human senses, and Post occupancy analysis.

Index Terms **- Therapeutic design, Mental disorder, Architecture, Environment, self-healing**

I. INTRODUCTION

Urbanization has resulted in such a reliance on technology that our lifestyle has become completely mechanized, resulting in busy work schedules, increased toxicity levels, reduced green spaces, un-planned and un-pleasant surroundings, congested living environments, and many other issues (Zohby 2020). Long-term consequences include a slew of health concerns and illnesses, as well as an overreliance on medicine, pharmaceutical medications, and health-care facilities. C.S Lewis said that although mental suffering is less dramatic than physical pain, it is more prevalent and more difficult to (Lewis 1940). Reasons may be any, but sufferings are similar. The ability of humans to understand nearby environmental factors influencing body senses supports our view of the built world. We build an image with our senses and link it with a memory. As a result, memories support much of our rich existence; people frequently link wetness with scent, dimension with echoes, and light with shadow. Predictions based on knowledge stored in our memory influence our conduct. Our view of the world frequently relies as much on knowledge stored in our memory as it does on new, incoming sensory input. Our behaviour is influenced by the built environment we experience. Perception activates the brain by allowing it to access these pictures and memories. In India, the mere idea of entering a health-care facility has long related to negative emotions such as stress, fear, and uneasiness (DeAngelis 2017). Most people identify hospitals with misery and death because of direct or indirect experiences. Even in modern times, despite progress made by healthcare professionals in providing more advanced and sophisticated medical facilities, many hospital visitors have negative feelings hence, their fears get compounded by a non-therapeutic environment. Architects and designers should not only be aware of how the built environment influences human behaviour, but they should also create living environments that take this link into account. Therapeutic architecture emerged from studies of architectural buildings designated for mental treatment. When exposed to a favourable calming environment, the human body follows and permits the mechanism of 'self-healing.' The aura of the area alters the perception of the individual. The goal of therapeutic design, which incorporates the five senses, is to create a calming and uplifting atmosphere that promotes recovery. Through design principles that inspire and stimulate the senses, should create experiences that persuade beauty and cultural integrity. Investigating sensory design and its ability to heal space and material, light and shadow, sound and texture are all intertwined in our daily lives. This paper aims to understand architectural environment for therapeutic healing. It focuses on how architectural variables may be managed and built to create a spatial environment that promotes patient recovery and well-being.

II. Related Works

To grasp the concept and philosophy that will be focused on while creating a Healing Center, the study of Therapeutic design is carried out via different case studies.

1. Dundee Maggie's Cancer Centre, Scotland

Built on the grounds of hospitals, Maggie's cancer caring centers are designed to be warm, welcoming environments that provide practical, emotional, and social support for anyone affected by cancer. Maggie's Dundee, architect Frank Gehry's first finished building in the United Kingdom. The institution supports cancer patients in Scotland and provides a compassionate atmosphere for patients and their families while they recuperate. The clinics combine the aspects of healthcare and treatment into a single structure that is considered part hospital, part church, part museum and part home. The display explores the distinctive architectural elements of each center, illustrating the importance of sensitive patient-focused design that can contribute towards helpful and healing environment.

Fig. 1 Dundee Maggie's Centre, Scotland

2. Fountain House, New York

Fountain House is the first mental health organization to be honored with this, the world's largest and most prestigious humanitarian award designed by Eggers & Higgins (Erfani 2017). Today, Fountain House empowers people with serious mental illness to live and thrive in society through award-winning employment, education, wellness, and housing programs. Fountain House, located on West 47th Street in New York City, was chosen as the site for this project because it offers a unique opportunity for spatial assessment of a community-based mental health prototype.

Fig. 2 Fountain House, New York

3. Quiet Healing Centre, Auroville

Designed by Ar. Poppo Pingel, this Healing Centre works on the understanding that a person is first and foremost a spiritual being seeking to express its truth through the instrumentality of the mental, vital, and physical nature. It is a place to relax, rejuvenate, recharge, and heal. Seven-acre beachfront compound approximately 5 km north of Pondicherry has strong connectivity with natural elements. The accommodation is provided within the Centre. The Zoning of the site is well managed and separated. The whole site is used for the planning of the Centre. The built up and open space zoning explains that the structure is well planned with green open spaces in between thus maintaining the connection of nature from exterior to interior.

Fig. 3 Quiet Healing Centre

III. Scope Of The Research

The primary goal of this research is to explore the factors that contribute to the creation of a healing environment. Through Post Occupancy Analysis, interviews with Psychologists, and Google forms for those suffering from Depression, PTSD, and Anxiety, we were able to come up with certain unique architectural characteristics that can aid the healing process and have a good influence on sensory input.

IV. Post Occupancy Analysis

The building-user interaction was investigated by analyzing the Post Occupancy Analysis and concluding them based on the needs of the people, which was followed by-

a) Four design objectives in the physical environment

- Attractiveness of physical environment
- Non-institutional physical environment

- Promotion of dignity and respect through physical environment
- Facilitating social interaction through physical environment

b) facilitation of staff and patient/visitors' interaction in the physical environment.

c) design features related to comfort of the visitors/patient-

- Furniture
- Views to outside
- Thermal comfort
- Lighting
- Color scheme

Furthermore, Interview with the Psychologist and Google forms were filled out by the people who are suffering from Depression, Anxiety and PTSD.

Results of Post Occupancy Analysis of Dundee Maggie Centre, Scotland (Fionn Stevenson 2007)-

- To justify the physical environment of Dundee Maggie Centre-

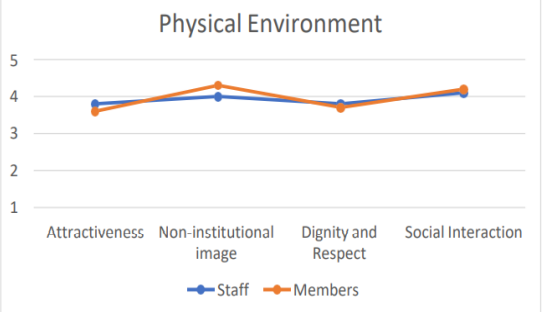


Fig. 4

- Facilitation of staff and patient/visitors' interaction in the physical environment-

Fig. 5

- Review of the design features related to comfort of the visitors/patient –

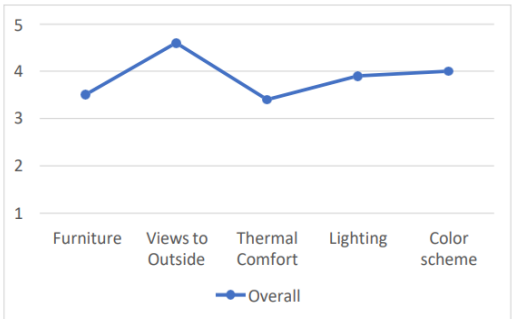


Fig. 6

Results of the Post Occupancy Analysis of Fountain House, New York (Erfani 2017)-

- To justify the physical environment of Fountain House-

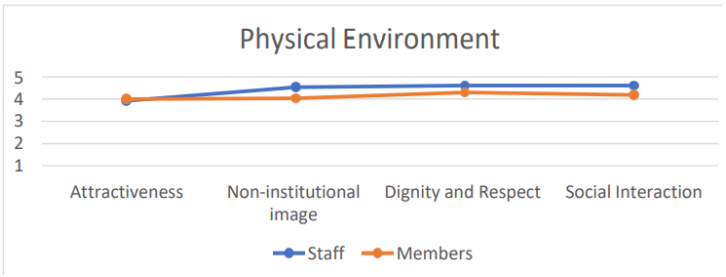


Fig. 7

- Facilitation of staff and patient/visitors' interaction in the physical environment-

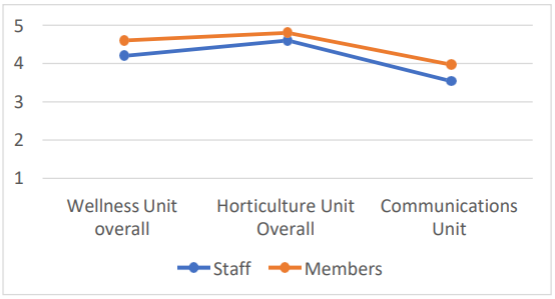


Fig. 8

- Review of the design features related to comfort of the visitors/patient –

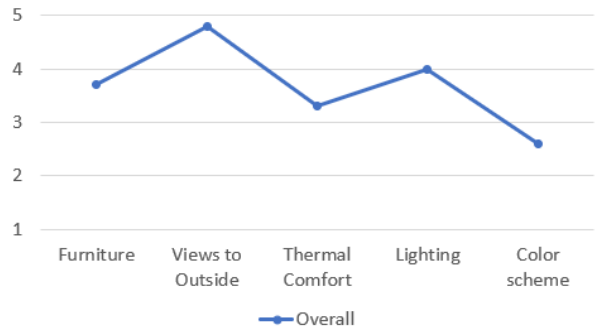


Fig. 9

Results of the Post Occupancy Analysis of Quiet Healing Centre, Auroville –

- To justify the physical environment of Quiet Healing Centre, Auroville

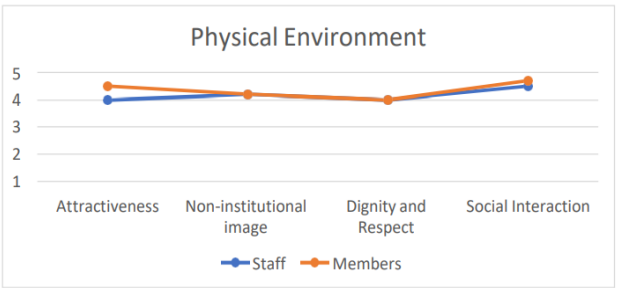


Fig. 10

- Facilitation of staff and patient/visitors' interaction in the physical environment-

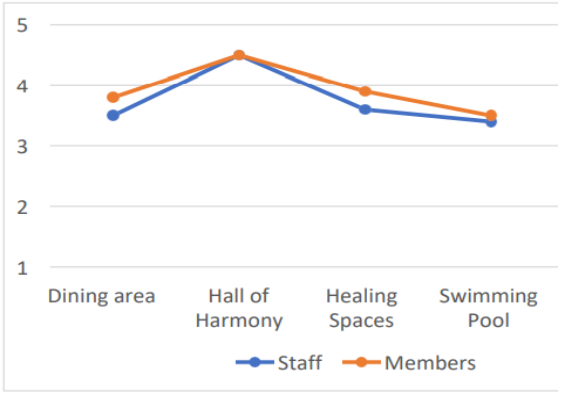


Fig 11

- Review of the design features related to comfort of the visitors/patient –

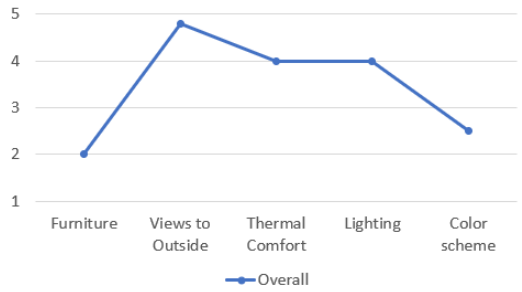


Fig. 12

Following are the answers of the Questionnaire conducted by us on psychologist of a health care Centre in Bangalore.

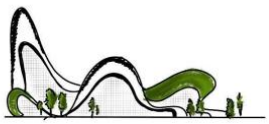
Table 1- Interview with the Psychologist of a Healthcare Centre in Bangalore

Q1- Do you think the built environment can heal them? Do you have any different opinion about interior and exterior? A1- Yes. The built environment does heal a person. It is very important to make the environment comfortable around the patient so that they can open with the doctors and hence they can create a bond in which they could portray what they have in their mind.
Q2- What would you like to see in a Mental Health care facility to focus on? A2- • A home-like environment and friendly environment and less institutional should be there in the surroundings to help the patient express there thought process. • The site should be away from the urban areas/ in the outskirts or should be kept isolated if the site is within the urban areas. • The main entrance and the reception should be welcoming and easily accessible. • The planning of the Centre should be easy with good navigation sign. • The interior should be calming and unthreatening. • Good acoustics to block unwanted sound. • Temperature should be comfortable in all seasons. • Natural light and ventilation should be good. • Views to nature and natural sound. • Free movement for the patient.
Q3- Do you have any thoughts about the Interiors of the Centre or the Rooms? A3- Materials should be in the background of the design. The patient should not check the materials directly but should get the warmth of it. Example- • Material- Wood. Gives a home-like environment and on the same time it is aesthetically pleasing. Apart from wood, to bring flexibility and safety in the room, cushion-based materials/objects should be placed to avoid self-harm. • Texture- Less textural interiors should be there. • Flooring- Carpets on floors should be there in the patient room and counselling rooms or common rooms visited by patients. Non-slippery tiles should be used.

- Color- Neutral colors should be used in the interiors.
- Lighting- Soothing Artificial lights/Ceiling lights should be used.
- Furniture- Large Cushion furniture with more pillows should be placed in the counselling rooms.

Following are the answers of the Google Forms filled by the patients/visitors suffering from Depression, Anxiety and PTSD. The responses are based on their personal experience which includes the experience in the Centre and some recommendations which can be added into the Centre.

Table 2- Google forms filled by Patients/Visitors

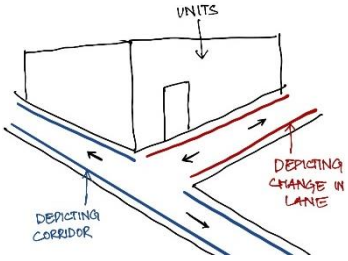
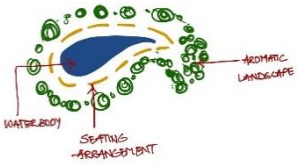
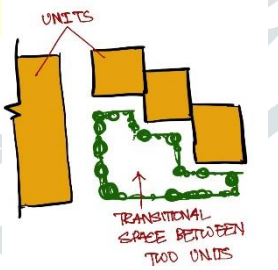
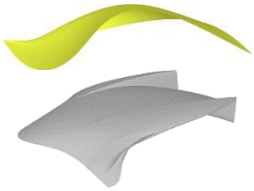
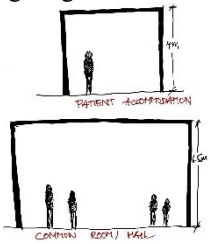
Q1-Age group A1- a) 18-25 **b) 25-40** c) 40-60 d) Above 60 The age group that actively took part in the survey is between 25-30. The most productive age group have the major mental health issues.
Q2- Are the counselling rooms comfortable? A2- a) Yes **b) No** No, the counselling rooms in the existing Centre are not comfortable. The comfort level includes furniture, lighting, material, and interiors.
Q3- Is the layout of the Centre easy to understand? A3- a) Yes **b) No** No, wayfinding is difficult in some Centre, whereas some Centers are not spacious.
Q4-What kind of structure gives you a sense of calmness?  **Curvilinear**  Rectangular A4- Curvilinear structures are liked by the people compared to rectangular structures.
Q5- Are social interactive spaces important in a Therapeutic Centre? A5- **a) Yes** b) No Yes, Social interaction plays a major role in healing process within patients. The counselling sessions generally take place in enclosed spaces. People when go to open spaces, they interact better.

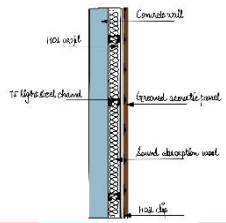
IV. RESULTS-

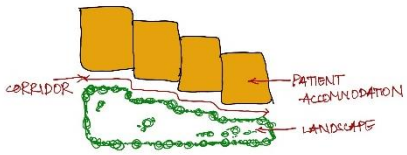
The following Architectural parameters were identified based on an evidence-based literature review that included scientifically proved studies, post occupancy analysis, live-interviews, and questionnaires.

Table 3- Design Recommendations

PARAMETERS IDENTIFIES	DESIGN RECOMMENDATIONS
Spatial Organization Zoning, Orientation, Circulation and Connectivity, Recreational Units	The Centre's site should be chosen based on its connection and accessibility from the road, as well as its surroundings and views. - Site should be more than 7 acres. - Good navigation and wayfinding are part of the circulation. - An asymmetrical but regular arrangement is easier to remember and learn than a symmetrical yet regular one. - Path continuity, i.e., loop-like pathways, is favored over dead ends since the latter frustrate individuals. - Creating landmarks and spatial distinction in appearance is critical for users'

	understanding of a building's spatial arrangement.  - Recreational units include – **Spirit-** Spa programs – Spa pool, Steam bath, Sauna, and religious facilities. **Mind-** Educational Facilities- Classrooms and discussion rooms -Psycho and Emotional Rest- Music Therapy, Light Therapy, Sun Therapy, Vichy Shower, Naturopathy, Sleep Therapy, Art Therapy, Horticulture, and gardening. **Body-** Clinical programs, Physical therapy, Examination/Therapy rooms, Stress testing, Consultation rooms, Waiting rooms, Therapy Pool, Office, Library, Workshop, Counselling rooms. Fitness programs- Aerobics, Exercise Machines, Weights, Basketball /volleyball, Running Track, Locker Rooms-Men/Women, Changing rooms. Administration department- Program director, accounting office, Sales office, Lobby-waiting area.
Landscape and environment Biophilic design, Transitional spaces	- Outdoors is linked to three key issues in hospital environments: views of nature, therapeutic gardens, and indoor plants. - Aromatherapy should be used as it is the practice of inhaling substances to improve psychological or physical well-being.    - Courtyards and sit-outs in between rooms and units.
Scale and proportion Built form, Ceiling height	- Curvilinear spaces activate the anterior cingulate cortex in beauty judgments (Oshin Vartaniana 2013). Hence these structures can be added into designing the Centre.  - For units like admin block and multi-purpose halls the ceiling height can range between 4-6.5 m. For patient's unit the ceiling height should be between 3.5-4m. 

Safety and security Non-desirable interior objects	- No sharp objects should be there in the interior like doorknob in the patient/visitor zone (Counselling rooms) or accommodation. - Cushion based finishings in the room like covering the door and window knobs with cushion cover, i.e., baby proofing the room for people with Chronic cases of depression, anxiety, or PTSD to avoid self-harm. - The furniture should be permanently fixed to the ground in accommodations.
Thermal comfort Placement of doors and windows, lighting, thermal comfort, climatic factor	- The Placement of door and windows depends upon the orientation of the building on site. Bay-windows can be used in rooms. Public spaces - Ceiling height- 4m-6.5m, Sill level - .3-.9 m, Lintel level- 1m Patient accommodation- Ceiling height- 3.5-4m, Sill level - .9m, Lintel level- 1m - Natural light should be maximum. Artificial light should be used to an extent to avoid glare. Glazed window should be used to avoid glare. - Task lights and side lamps in counselling rooms. Ceiling lights should be placed in patient accommodation to avoid self-harm. - Heating-cooling systems should be in control of the patient/visitors. Shading devices on the windows and open areas.
Sensory experience Sensory experience, color, acoustics, sensory rooms, sensory rooms, furniture	- Sensory rooms with good acoustics to keep the sensory stimuli calm for patients with chronic case. Apart from sensory rooms, units like mediation rooms/ yoga rooms should be planned in the Centre.\ - Green-vertical walls/gardens in between units with high stimuli activity to cancel noise. -Activities like Art and craft, photography, gardening (horticulture), dancing, music are some activities which can help reduce stress. Aquarium can be used in between units for reducing stress.  - Acoustic wall and panels should be used in sensitive zones and sensory rooms.
User-friendly design Barrier-free design Patient accommodation	- These include door and passage lengths, flooring surfaces, counter heights, door handles, and railings, as well as signage and aural signals and tactile aids. For recreational units – • Width of passage (min. 900 mm) • Finishes of floor surface with non-slip floor material like Ceramic tiles. • Installation of handrail to support the body weight at the critical places e.g., staircase, toilet, ramp, passage with a change of level (800-850 mm). • Extension of handrail on the flat landing at the top and bottom of the stairs (300 mm). • To prevent slipping off the cane or crutch from the side of the stairs or ramps (20 mm high lip on the exposed edge). -Patient accommodation should be designed according to the cases- - Normal, Mild, and chronic cases. **Normal-** People who come under this category are easy to recover and handle and needs minimal staff and counselling session. The stay is of minimum days. Hence, Home like environment should be designed for people under normal category. Study table with chair, bed, cupboard, anti-skid tiles in the room and washrooms, Television with limited channels, Ceiling height of 3.5-4m, walls of linen and neutral colors, placement of windows near the bed to get a natural view should be designed. **Mild-** Need to be under observation in intervals, interiors should be kept simple and less distracting. Minimal interiors like a small table-chair in the corner of the room, Neutral colors in the interiors, Open-cupboard, Placement of window anti-skid tiles in the room and washrooms, minimal watch of staff, placement of windows near the bed to get a natural view should be designed. **Chronic cases-** Need to be under observation 24hr, interiors should be kept simple and less distracting. The furniture should be cushion based and bolted to the ground to avoid self-harm. Windows with sill level of 1m with a small doorknob. Cushion-based walls in the interior with carpet flooring, anti-skid flooring in the washrooms should be designed. The rooms should be designed in such a way that the staff can keep a 24hr surveillance with easy accessibility, placement of windows near the bed to get a natural view should be designed.



V. CONCLUSION-

Therapeutic architecture can increase access to healthcare as well as any "underlying elements" that may encourage fuller fulfilment of the right to health. This dissertation reevaluated the existing facts in the field of architectural therapy as well as the demands of persons seeking such therapy. This dissertation includes a proposal for a constructed result as well as a consideration of the unfulfilled goals and needs of people who visit the health center in terms of the built environment. Many researchers have worked on evidence-based publications indicating that the built environment has an influence on the human brain, therefore the relationship between architecture and neurology is open and dependent on each other. The primary goal was to comprehend therapeutic healing via architecture by establishing the characteristics that aid in the creation of a therapeutic environment.

The most successful study is post-occupancy evaluation since it shows people's unfulfilled wants and requirements. Direct interviews with patients and health Centre personnel are used in this study to determine the major complaints regarding the Centre's physical environment and surrounds. In this dissertation, the current POE was explored by following the given design requirements via literature, ending in findings offered by people involved in constructing the POE. This study's findings support the notion of prioritizing evidence-based design advice that may be employed when developing a healthcare or therapy facility.

Further study which can be done in this topic is that-

- More Post occupancy evaluation can be done in India in government and private sectors.
- The recommendations can be designed and seen in VR to get the initial evaluation done by the intended users.
- Comparing the post occupancy evaluation of the centre a, good cost-effective design can be a solution which can be further used to design centre in India.

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