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WOMEN AND CHILDREN'S HEALTHCARE AND TRAINING CENTRE IN BAIRAGAD, MELGHAT

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ABSTRACT

A lot of backward/tribal areas over the world lack proper healthcare facilities. But it worsens when it comes to women and children and the healthcare facilities available to them in these areas. Lack of spatial planning, overlooked infrastructure and services by the government or the planning authorities, lack of awareness all contribute to the poor health and conditions of these people in the backward/tribal areas especially women and children are the sections of the society that suffer the most. Architecturally designed spaces could contribute a lot while upgrading as well as improvising these healthcare facilities because architecture deals with understanding the problems of the space as well as its surroundings and then designing proper spatial solutions on these problems. Thus, architecture would play a major role in designing healthcare facilities as well in these backward regions. Moreover when it comes to what aspects of the healthcare facilities to plan women and children are of course a major aspect but the focus should also be given on how to make a properly functioning module which is catering to training para-medic staff as well and how by creating spatial facilities for living and practicing, volunteers and doctors would favour to come in the region and work in the healthcare facility to be designed and thus being the human resource to deal with the health problems in that region.

BACKGROUND

Some important background factors related to the thesis were studied as follows –

Present Circumstances

Certain specific reasons pertaining to a place that might be good or bad, drive the urge to make something that would eliminate the drawbacks of that certain place as well as develop further the already prevailing good attributes of that place. As of women and children's health care facility is concerned, Melghat, specifically Bairagad, is such a place that had a bad reputation for lagging extensively in this matter, so much that the mortality rates of women during pregnancy, their new-borns and basically children were sky high. These have somewhat reduced today all due to some healthcare volunteers who selflessly volunteered to develop the region of Bairagad in all aspects and thus received recognition and appreciation from the country.

Healthcare History of Melghat

Malnutrition is prevalent in Melghat and two decades ago, the talukas of Chikhaldara and Dharni, of Melghat made headlines for all the wrong reasons. As 5000 children were reported as dead from malnutrition-related complications at that time, efforts have been made to ensure the babies born here have a fair shot at life with a healthy childhood. The situation has improved since then but six in every hundred children died within a year of birth in Melghat in 2018-2019 and the reason for this is malnutrition leading to susceptibility to infections and high mortality.

Current Healthcare Situation and Scope of Women and Children's Healthcare Facility in Bairagad, Melghat

Being a prominent healthcare worker and also a Padmashree awardee Dr. Ravindra Kolhe has an already setup small health unit in Bairagad with the help of the people living over there itself. Having a basic

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health care unit already focus could be put forward to setup a unit for just the women and children's health care unit especially.

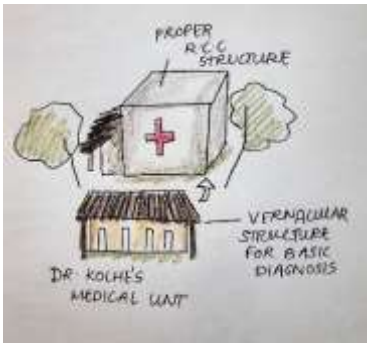

Figure 1 - Schematical diagram showing Dr. Kolhe's clinic where the basic waiting and appointment part is made out of local materials whereas, the operational and treatment part is made up of proper R.C.C.

But elaborating the structural attributes of the same set up unit, it is basically a bigger version of the typical poor Bairagad village house with mud walls and thatch roof while most of the part is made up of bricks, R.C.C. and corrugated sheets for roofing. In a broader spectrum, an already setup basic health care unit which is successfully working all these years indicates that the tribal people over the region are at least somewhat aware that proper medical assistance is needed from professional people like doctors rather than practicing their age old techniques that do not hold fruits every time and in case of serious illnesses. This makes it easier to go a further step into setting up proper architecturally designed health care facilities as well as training center for women and children specifically where all the provisions would be available initially focusing on the prevention of basic prevalent diseases by providing awareness through training centers and then the healthcare unit to tackle maternal health issues, pregnancy care and deliveries on a ground level as well as general women's health issues and basic health issues of children and general people.

Figure 2 - Requirement of Para-medical staff facilities

Current Amenities and Access -

The villages in the Dharni taluka, especially Bairagad, have poor public access to basic amenities. Most of the houses/huts in the villages were made of the locally available bricks and thatched with grasses or bricks. The huts were small in size with one or two rooms and a separate kitchen in most houses. They did not possess any valuable household items, except utensils. Households in the region used fire-based ovens that were locally constructed, and no one was found to use liquid gas for cooking.

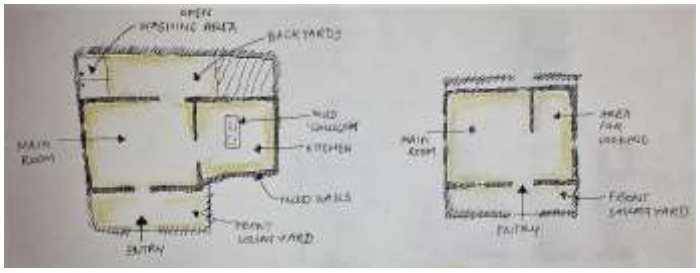

Figure 3 - A schematical diagram showing basic plans of mud walled houses around Bairagad

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Women and Children's Healthcare Facility Needed -

Children come into picture when the term 'Maternity' comes into picture. A women and children's health care facility would partly act as a sub-centre as well as partly a basic healthcare centre which will deal with illnesses specifically of women and injuries at a very ground level. It would provide treatment for minor ailments including fever, Diarrhoea, ARI, worm infestation and First Aid.

Figure 4 - A mother with her child.

Training Centre -

The Training Centre kept as the foremost source of improving health standards of theses tribal backward people, importance is given on the training of the small scale para-medical staff, nurses etc. Further on, along with that, a lot of awareness programmes where women's health related issues, hygienic sanitary practices, general hygiene and health related issues etc. are tackled.

Current Architectural Building Practices and Government Schemes

Building Practices of the Korku Tribes in Bairagad, Melghat

Most of the houses/huts in the villages are made of the locally available bricks and thatched with grasses or bricks. The huts are small in size with one or two rooms and a separate kitchen in most houses. The Korkus (prevalent tribe in the Bairagad) having no access to proper building materials and due to extreme poverty, have to rely on the Melghat forest to procure the building materials for their homes which mainly include wood, thatch and bamboos. Very basic and poor homes are mud-walled with thatch roofing and for the compound of the house, sticks and thatch are used tied together with twigs. Even though bamboo growth is seen in the Melghat forest, it is rarely used and is not considered a major building material by the Bairagad residents. On the other hand, due to the new Pradhan Mantri Gramin Awaas Yojana Scheme of the Government, most of the people who fit under certain criteria are being provided specific amount of funds by the Government and are encouraged to build proper homes fitting in that budget. Thus, most of the houses, coming under the scheme, are built with proper bricks, R.C.C. and corrugated sheets for roofing but are generally small ground-floored structures to fit in the budget.

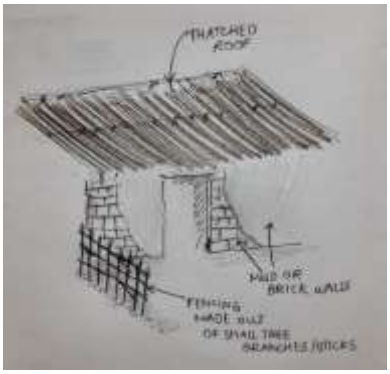

Figure 5 - Typical House in Bairagad

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Government Housing Schemes for Tribal Areas in Maharashtra

Pradhan Mantri Gramin Awas Yojana (PMGAY), previously Indira Awas Yojana is a social welfare programme, created by the Indian Government, to provide housing for the rural poor in India.

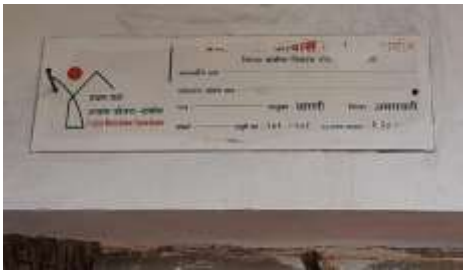

Figure 6 - PMGAY sticker on houses

Bamboo Usage (One of the Prominent Local Materials in Dharni) and Soil Type -

Bamboo is prominently used in the building of local houses in Dharni as well as in Bairagad. The town of Dharni also possesses a Bamboo Nursery as well as in Bairagad and the areas around Bairagad, Bamboo usage as well as cultivation is prominent. Dr. Kolhe (aforementioned) has also used Bamboo in the construction of his old home and some part of it was even used as a health clinic but on a small scale.

The entire region sits on BCS (Black Cotton Soil) which could be used to cultivate Bamboo (also the virtue of Tapi river around) but BCS is very critical when it comes to construction. Typically for Shallow Foundations, Mat Foundations are used but if the depth of the BCS which is vulnerable to seasonal changes is beyond 3 mtrs. , then resorting to Deep Foundations like Pile Foundations is recommended. Even economically speaking, Pile foundation could be the preferable option.

Targeted Population who needs a Women Healthcare Program

Population within a diameter of 50 kms. around Bairagad, mostly towards the north which didn't have a proper healthcare facility especially for women was considered. The selected area consists of 76 settlements with a total population of 80000 both in Maharashtra as well as from Madhya Pradesh.

As per the UDCPR, a women healthcare program is needed each for 80000 to 100000 population.

Along with all of this, Bairagad is centrally situated among all the scattered villages of Melghat towards the Maharashtra – Madhya Pradesh border. Thus, providing the health care unit here would be proven beneficial as it will make up to be a junction connecting various other small villages around it for women and children's health care.

Figure 7 - Author's representation of location of Bairagad

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INTRODUCTION

The economy of any country/democracy cannot survive or stand if its population is not healthy. In case of an incompetent or incapable population, education and opportunities are the keys. But, health being a very sensitive and first hand subject as compared to education, along with proper precaution, a successful health care plan along with appropriately and well designed health infrastructure for everyone is utmost important. Sociologists of health and illness have tended to overlook the architecture and buildings used in health care. The efficiency and success of a healthcare facility depends upon the efficacy of its design as healthcare facilities deal with people having illnesses and in this period, the ill-conceived spatial vicinity of the healthcare facility shouldn't further intimidate and jeopardise their mental as well as physical health. Speaking of, a lot of healthcare facilities don't work efficiently because of the badly planned and overlooked infrastructural design. There is a difference between a proper understanding of the functioning of the different units of the healthcare facilities to be provided and then designing spaces accordingly and just building the structure for the sake of calling it a healthcare facility. Wherein, the former one which is the desired and required solution requires architectural involvement along with just engineering.

The current health care facilities are such that they don't cover every aspect of human population to the fullest extent and the same could be seen especially in the case those living in the backward and underdeveloped regions of the country. More prominently, the women and children belonging to such regions. Mothers and children constitute the major proportion of our population. At the same time these two groups are very vulnerable and require special attention in healthcare facilities along with deliberately planned health care infrastructure.

Why a Tribal Region like Melghat -

Tribal Health is the most neglected part of our health care system and has to be equally dealt with like the urban as well as the rural areas. The tribal villages in Melghat, especially Bairagad, have a history of maternity deaths and malnutrition but, the count has reduced so since the last four to five years.

Architecturally speaking, presently there is no proper health infrastructure present in Melghat especially in Bairagad except for the health clinic of prominent and Padmashree awardee Dr. Ravindra Kolhe who has selflessly worked in terms for the betterment of the people living in this region. According to him, a lot of potential volunteers and doctors avoid coming to that place due to a lack of properly planned and designed spatial provisions and inadequate facilities for them to stay in. Plus, there's no shortage of advanced medical equipment but the spatial provisions are not designed and planned.

Figure 8 - Bairagad as highlighted on map

Why a Training Centre along with Health care facility -

Prevention is always better than cure. In this Tribal context, two basic reasons are accountable for the poor health of its people and they are mainly – Lack of awareness and poor health facilities and infrastructure. Elaborating on the former point of lack of awareness, the major focus of the entire project

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lies in how serious health consequences especially maternity and child health related serious consequences could most of the times be avoided if the people, especially the women are made aware of their own health and bodies. At times when proper medical admission and medical care is required at the grass-root level a healthcare unit would be required. Even the para-medical staff at the health unit could be trained at the training center and accordingly more focus would be given to this aspect of the potential users when it comes to designing training spaces.

CASE STUDY DESIGN INTERVENTIONS AND CONCLUSIONS

Certain projects were studied which were mostly related to the proposed thesis, "Women and Children's Healthcare and Training Centre in Bairagad, Melghat. These projects were studied in parts and the portions of the projects which were relevant to the aspects of the proposed thesis were highlighted, elaborated and analysed in detail.

The following are the design strategies of the respective projects studied as well as further on the comparative analysis in a chart format.

1. Tribal Friendly Hospital, Gadchiroli

The hospital, established in 1993 was built after extensive consultations with the local tribal population, is unique in its architecture and ambience. To be responsive to their cultural sensitivities and to make it tribal friendly, the clinic was modelled on a typical tribal home. There is a temple of *Maa Danteshwari*, the supreme Goddess of the tribal Gond at the hospital entrance, whose blessings are essential for the healing. The doctors in the hospital avoid wearing "inauspicious" white clothes and the OPD has significant open space with trees where the patients wait their turn sitting below the trees on a platform, exchanging notes with others. Patients admitted are allowed to live with their family members in huts built as per the specifications led down by the local tribes around the indoor facility. Hence the tribal had significant ownership of the hospital naming it as "*Maa Danteshwari Davakhana".*

Figure 9 - 'Maa Danteshwari' Clinic

Inferred Design Considerations

Accessibility –

The location of the hospital is such that it is catering to all the surrounding villages scattered in the area. It is centrally located near the largest village so that it would create a network of healthcare facilities to the surrounding villages.

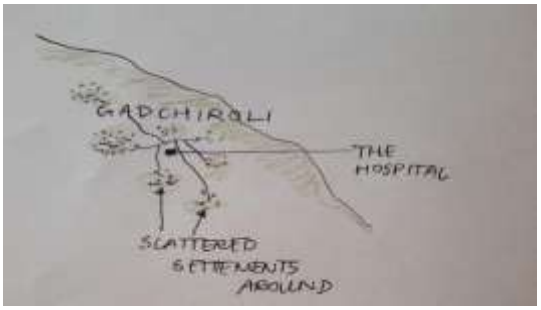

Figure 10 - Author's representation of hospital location

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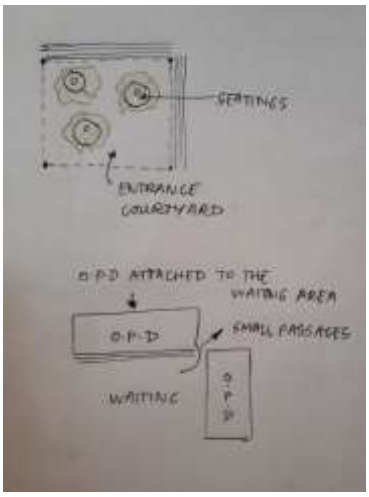

Figure 11 - An entrance courtyard planned

The Entrance Courtyard -

Native to the typical tribal houses around, the hospital has an entrance courtyard which acknowledges the principles of the tribal communities of "living in a community", as the Central courtyards prove to be the waiting area for the patients/people.

Typical Hospital Structure –

The Hospital even being in a tribal region follows the typical Hospital Structure as follows

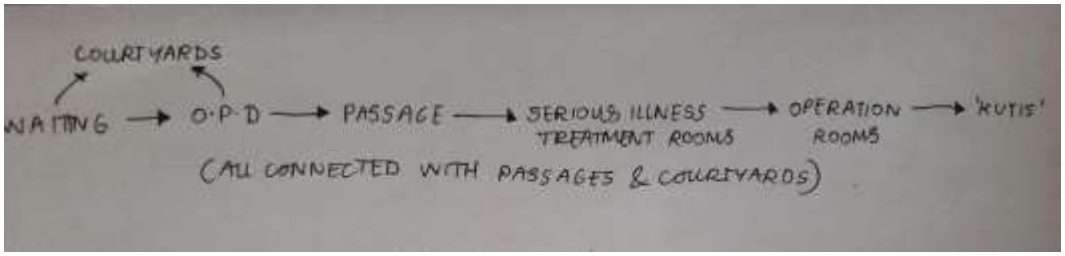

Figure 12- Structure of a basic hospital

Where in the above mentioned structure is derived taken into consideration the movement of the people as well as patients and the allied services required.

Kutis are provided as an after care shelter for the patients after the operations or other treatments as well as their families to accompany them.

The Built up and Void Ratio -

As every tribal house in the following region follows a specific built up to void ratio, the hospital structure follows the same too. This might be done to cater to the temperature for e.g. Courtyards help to create stack effect, plus the area lying in a hot and dry region. The climatic conditions plus respecting the principles of the tribes 'Community Living'.

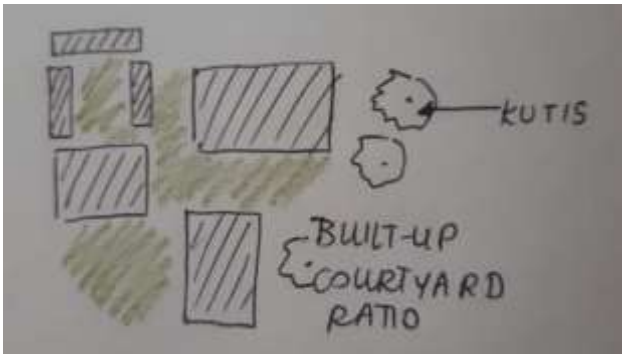

Figure 13- Built-up and Void ratio

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The Passages and Open Spaces to Kutis -

Mostly Kutis were used for rehabilitating patients. Structure is so designed to create proper accessibility from these Kutis or operating room to allied services keeping in mind the circulation as well as climatic aspects like the air flow.

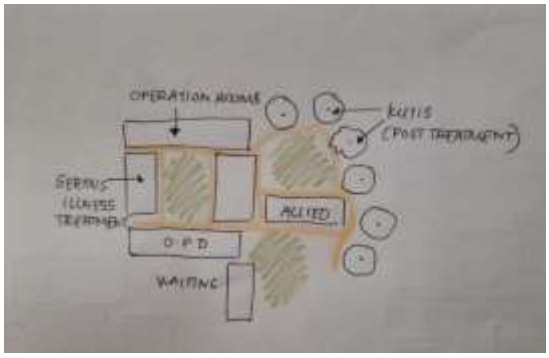

Figure 14 - Open passages to 'kutis'

2. Women's Health Care Facility and Training Centre in Ouagadougou, Burkina Faso

Introduction

The CBF Women's Health Centre in Burkina Faso was created between 2005 and 2007 by AIDOS, an Italian NGO fighting for Women's Rights in Developing Countries.
The AIDOS project, financed by the Democratici di Sinistra Political Party and with a contribution from the European Commission, is just one of the group's international programs focused on contrasting the diffusion of Female Genital Mutilation .The social/health-services program developed by AIDOS, together with its local partners was focused on providing the educational services, information and awareness about women's sexual and reproductive rights in Sector 27 of Ouagadougou, a peripheral urban area settled by the rural population. The social program called for the realization of a building complex capable of hosting a variety of activities in very harsh circumstances. The architectural project represents the response to this condition.

Figure 15 - A view of the health facility

Design Interventions –

- The project privileges an integrated approach to interactions between built space and climatic-environmental conditions, based on considerations of sustainability and appropriateness.
- The project is based on the separation of the primary activities performed by the CBF into two distinct, though closely related buildings:

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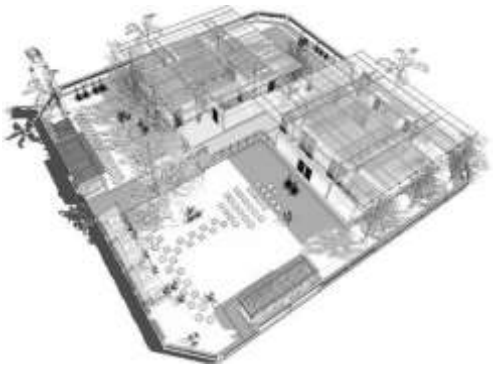

Figure 16- A 3D representation of the whole unit

- A Training Centre dedicated to activities of awareness - building and the administration and management of the CBF, and a Consultancy Centre, used for medical visits, legal assistance and psychological counselling.
- The two main buildings are set atop a single structural element: a raised platform that creates a true artificial plane that supports various buildings used for different purposes. The raising of the platform above the ground ensures hygienic/climatic conditions that are extraneous to local culture and practices of building.

Figure 17 - Typical plan

- The two main buildings are protected against rainfall and, above all, direct sunlight, by a light, waterproof PVC recyclable velarium, supported by an independent structure of steel 'trees'. This sloping tarpaulin is part of a system that collects and stores rainwater, which is used to irrigate the garden.
- The volumes that contain the various rooms are independent of the roof structure and freely placed atop the platform. They are articulated around a series of shaded and ventilated patios that ensure privacy from the exterior. The modular configuration of the structure allows for future expansion, preserving the general framework of the building.

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Figure 18- A view of the entrance

- The building walls are constructed using compressed dry stacked clay bricks, BTC, made on site using a rough mixture of earth, cement and water. The bricks were baked in the hot sun, with no energy consumption, thus limiting the environmental impact of the material.

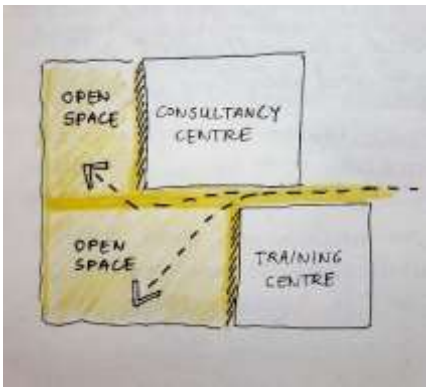

Figure 19 - Schematical diagram showing air flow in plan

- The choice to use these bricks is based on their temperature and humidity reduction characteristics, enhanced here by their protection against contact with water, perhaps the only serious limitation they pose.
- The buildings are covered by corrugated aluminium and translucent decking, which allows light to filter into the interior, reducing the need for artificial illumination.

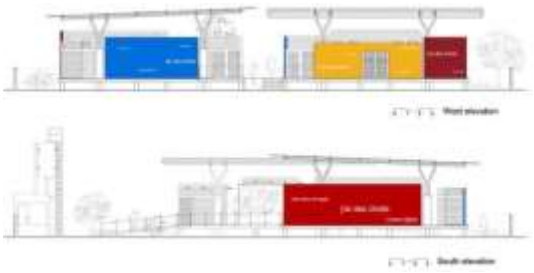

Figure 20 - Elevations of the structure

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- The space between the steel roof and the velarium, the open cavity underneath the platform, together with the exterior openings fitted with operable glass fins, help to improve the natural ventilation of interior spaces, drastically reducing the need for mechanical air conditioning.
- The exterior space, similar to the interior, is designed as an open area to be used by the entire community. It is a space of sharing and of information, used to present the themes dealt with by the CBF. Indirect and informal communication is also favoured by the organization of small events and public discussions. The garden is a micro environment that surrounds the buildings taking advantage of the shade provided by the building and trees and the humidity produced by the plants.

Adopted Strategies for Temperature Control –

Temperature control, perhaps the most significant climatic issue, has strongly influenced the overall design. The adopted strategy for the same includes –

- Carefully studied building orientation, reducing the effect
- of hot wind and taking advantage of mutual over shading
- The shading of heavy material against direct exposure to the sun
- Extensive use of operable windows
- The separation of enclosed areas by transitional spaces, such as
- Verandas or patios.

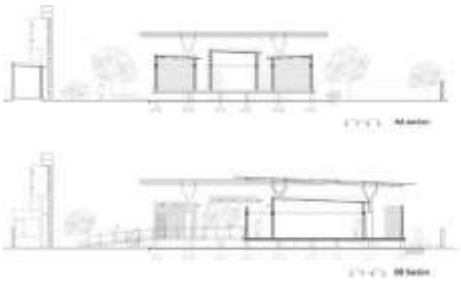

Figure 21- Sections

The outside walls, with no openings, are finished with a plaster coat, painted with bright colours.

3. Health Care Facility in Senegal, Tribal Tambacounda

Tambacounda Hospital is the largest hospitals in eastern Senegal. It serves the city's 80,000 inhabitants and more than a million people from the region. Twenty doctors treat 20,000 patients per year under very difficult conditions. The region suffers from poor public health, with life expectancy ten years lower than Senegal's average and one of the highest infant and child mortality rates in the country. In 2017, Manuel Herz Architects were chosen to design a new Maternity and Paediatric Clinic for Tambacounda Hospital, aiming to improve this situation.

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Figure 22 - A view of the project

Design Interventions –

The building has a curvilinear volume, that is as long as possible to create many social spaces, and as thin as possible to react to the harsh climate. The curvilinear shape is a direct reaction to the existing circular buildings on the hospital site. The new clinic embraces these buildings, curves around them, thereby creating several new exterior courtyards, and allowing all existing trees on the site to remain.

Figure 23 - Design Strategies

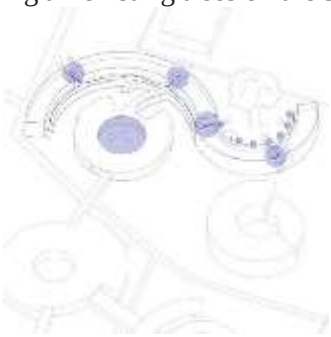

Figure 24 - Spaces distribution

Along the length of the corridor, different kinds of waiting spaces are offered.

The thinness is a direct response to the climate. They created a building that does not need air-conditioning (apart from the operation blocks and intensive care units), hence with a much reduced energy footprint. The corridor has rooms only to one side, while the other side features a perforated brick wall that allows for wind to cross-ventilate all rooms in the building. The temperature differences between slightly hotter and (because of shading) slightly cooler areas, creates air movement. The building is therefore its own climate machine, creating a local micro-climate that is more temperate than its surrounding. All electricity is supplied by a solar panel array.

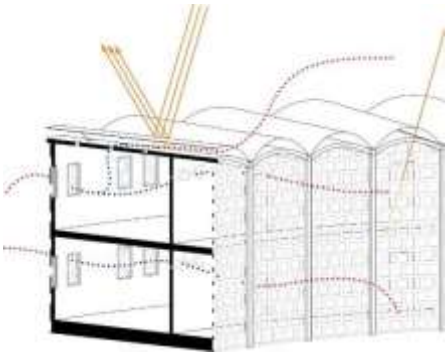

Figure 25 - Perforated walls to keep air flowing

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Figure 26 - A view of the Spiral Staircase

4. Rural Health Training Centre (RHTC), Vaitarna

Overview –

- Vaitarna, situated at a radial distance of 95 Km from Lokmanya Tilak Municipal Medical College and General Hospital, Sion and about 17 Km from Khardi Railway Station, is a full of scenic beauty. The Dam at Vaitarna supplies potable water to Mumbai city.
- Vaitarna has approx. 40 families with a municipal health unit. This health unit caters to the population of approx. 5000 in and around Vaitarna. There is one more health unit at Tansa which is located 22 km from Vaitarna & 8 km away from Atgaon Railway Station.
- 19th January 2009, Department of Community Medicine, Lokmanya Tilak Municipal Medical College in collaboration with Hydraulic Engineers division, Vaitarna, started Rural Health Training Centre (RHTC) at Vaitarna, Taluka- Shahpur, District - Thane, with the aim of providing routine and emergency 24 X 7 healthcare services to employees and their family members and also to the villagers nearby.

Design Interventions and Inferences -
The training centre is one of the structures in the complex of about 2500 m. sq. Other structures include the mess facility, guest house and residential blocks. Care has been taken to –

- Ensure maximum open area and retain on-site vegetation to the fullest.
- Using vernacular materials wherever possible.

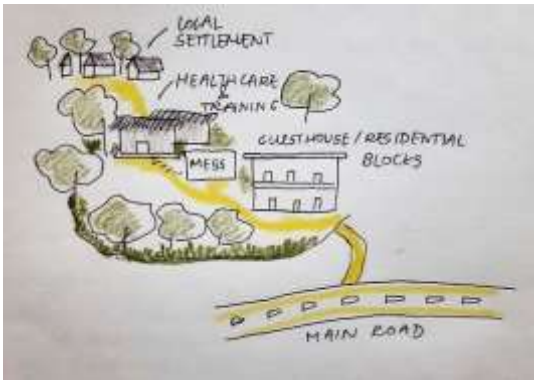

Figure 27 - Author's representation of the location of the training and healthcare unit

The health centre is thus totally made out of bricks, cement and corrugated roofs being a ground structure, whereas the residential blocks and guest house are 'G+2' Framed structures. Here, they ensured that -

- The residential and guest house block being situated on the front road, they are made out of R.C.C. and bricks whereas the Training Centre is situated a little to the deeper areas of the site towards local settlements and vegetation thus keeping it vernacular and a Ground structure.

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Figure 28- A view of the training centre

The typical plan of the health training centre shows the simple arrangement of all the rooms used for different activities along with an amalgamation of courtyards. It sits as one of the structure in the complex containing residential blocks, mess, and guesthouse.

Figure 29 - Typical plan of the unit

Verandah and Courtyard is created outside the structure as well as open space is provided on all the sides of the structure.
Space has been provided for the provision of Ambulance service for the locals and Private Bus parking for the Volunteers. In-design spatial provisions are made for the same.

5. Okinawa Nursing Training Centre, Japan

Overview

Architects: IIDA Archiship Studio Area: 4377 m²Area: 4377 m² Year: 2013Year: 2013 Structure: RC+SRC Site Area: 14950m2 City: Haebaru Country: Japan

Figure 30 - A view of the training centre

"Okinawa Nursing Training Centre" is a new head office of Okinawa prefectural nursing association and also a training centre for nurses to train various practical techniques. The architect for this project has proposed a new Architectural style that could be realized only in this place and also deeply related to environment and climate of the place.

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Design Interventions –

There are 4 large RC roofs that block out Okinawa's very strong summer sunlight. The roofs create a large shade underneath and we call there “lounge”. In the “lounge”, there is no air conditioning and lighting equipment.

Figure 31 - The cantilever roofs of the training centre

They came up with usage of natural winds, reflected sunlight and stable underground heat. The “cool-tube” system and the openable windows to accommodate all environmental conditions automatically work well to keep “lounge” comfortable through a whole year.

Figure 32- The interiors of the unit

The roofs form a continuous shade from the fourth floor to the ground and the area getting created between the actual built structure and the roof is deemed as the ‘lounge’ as seen in the section. And the structure is levelled so that the overhang of one compartment would act like a slab for the upper compartment.

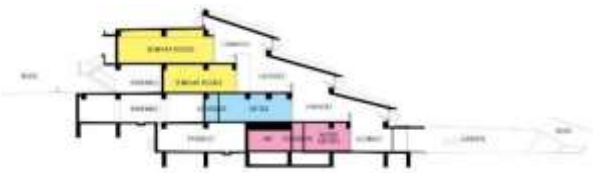

Figure 33- Section cut through the unit

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Figure 34- Interiors of the unit

They set up air conditioning machine only for some rooms facing the "lounge" and this minimum usage of artificial devices contribute to reduction of environmental impacts and running costs.

6. Live Case Study - Eye Clinic in Dharni (Tribal region)

Introduction

Dharni, a tribal village lying in the far north-east corner of Maharashtra in the Melghat region and at the borders of Madhya Pradesh, is a growing and developing region with respect to the well-being of the tribes in its boundaries. Dr. Kolhe, a Padmashree Awardee and a "1 Rupee" selfless doctor settled in the outskirts of this village and runs his clinic in the outskirts of the Dharni village and in Bairagad (a village under the Dharni Taluka). One of the many clinics is an eye clinic lying just besides his own house.

Figure 35 - Author's photographs of the eye clinic in Dharni

Design Interventions and Inferences

View and Complex –

- The 'Prayer Eye Hospital' has been set up by Dr. Kolhe for the local tribes living in the small scattered settlements around the region for free or sometimes a minimum fee of 1 rupee. The Complex consists of their own home, a storage, the eye hospital and a raised plinth besides the hospital for Training Camps to be set up for volunteers and doctors coming from the city.
- The Training Space is just an open space with one banyan tree located besides the hospital and the entire clinic is surrounded by their farm.

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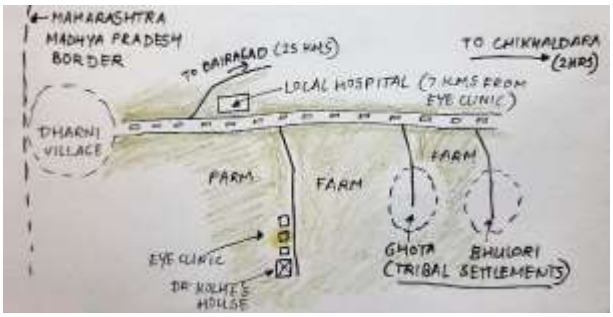


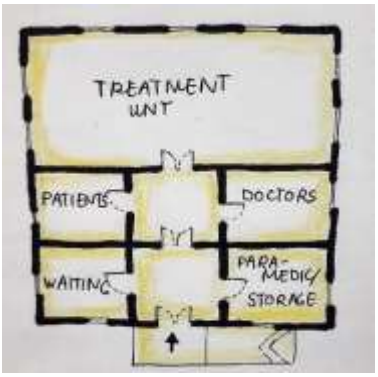
Figure 36 - Author's representation of the location

The Hospital Structure –

- The hospital is a very basic R.C.C. structure on a raised plinth of 0.60 m. This is done to prevent the mud and soil from entering the structure as the road to the structure is muddy.
-

Figure 37 - A view of the structure

- A ramp is provided for the disabled people along with stairs but the only drawback being the ramp getting slippery due to the use of wrong tiles during rainy season.
- The height of the structure is maintained to 4.5 m as in summers the temperatures are high and thus some rooms have louvered windows at the top of the walls for ventilation working as 'stack effect'.



Author's representation of the typical plan of the clinic

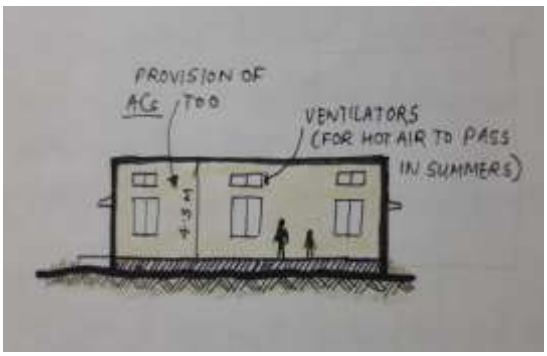


Figure 38 - Section of the structure

- Proper segregation of Doctor's rooms, patients waiting, storage stack rooms and the treatment section is done for the interior planning.

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Figure 39 - Treatment area

- Most importantly, properly built toilets are proved both for the patient's room as well as the doctor's cabin / room.
- Storage rooms for equipments required in an Ophthalmology clinic and other requirements.

Greatest drawback as mentioned by Dr. Kolhe

The only flaw is that for most of the part of the year, the clinic is not used due to the non-availability of doctors. This is due to the inadequate building facilities for doctors to stay. The hospital has all the advanced equipment but the spatial provision for all of it is not designed properly.

Figure 40 - Storage unit

COMPARATIVE ANALYSIS

The topic being Women and Children's Healthcare Facility and Training Centre, certain Case studies were referred to and inferred. But, every one of them not completely relating to the topic some case studies were analysed only for their healthcare part and some case studies were analysed only for their training centre. Thus, the inferred chart has been comparatively analysed dividing it into Training Centre and Healthcare Centre

Training Centre –

All the four Training Centres compared are located in different Contexts and thus the building design and material usage is mostly vernacular to the place.

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Project	**Women's Health Care Facility and Training Centre in Ouagadougou, Burkina Faso**	**Rural Health Training Centre (RHTC), Vaitarna**	**Okinawa Nursing Training Centre, Japan**	**Live Case Study – Training Centre in Dharni (Tribal region)**
Type	Management and Training Centre	Rural Training Centre	Nursing Training Centre	Open Training Centre for Volunteers
Location	Ouagadougou, Burkina Faso	RHTC, Vaitarna	Haebaru, Japan	Kolupur, Dharni
Context	Rural	Semi-Urban	Urban	Tribal/Rural
Site Area	500 m. sq.	2500 m. sq.	4377 m. sq.	2724 m. sq.
Built-up Area	125 m. sq.	1800 m. sq.	2920 m. sq.	1080 m. sq.
Number of Storeys	Ground floored Structure	Ground floored Structure	'G + 4'	Ground floored Structure
Programme	Basic Maternity Medicare, Consultancy Centre and Training Centre for Building Administration and Management of CBF	Medical Consultancy and Para-Medical Training Centre	Training Centre for Nursing Students	Training Camps for Volunteering Doctors and Volunteers
Building Type	Institutional	Institutional	Institutional	------
Architectural Context	Load Bearing Structure with Stacked Clay Bricks (made on-site)	Load Bearing Structure with Bricks, Cement and Corrugated Roofing	R.C.C. and Precast Concrete (Mid-Rise Building)	Open area on elevated 0.45 m. sq. plinth

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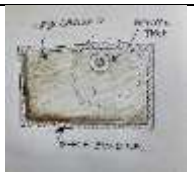
Material Pallet	Stacked Clay Bricks, BTC, Corrugated Aluminium Sheets, Glass Panels, Structural Steel Supports	Bricks, Cement, Corrugated Metal Roofs	R.C.C., Perforated Precast Concrete, Glass	------
Structural System	Load Bearing Structure with Steel Supports for Roofing	Load Bearing Structure	R.C.C. Framed Structure and Pre-Cast Concrete Perforated Outer Walls	Open Area on Plinth
Sustainable Strategies	Vernacular Materials, Open Spaces, Verandahs, Renewable Resources, On-Site Brick Construction, Building Orientation, Overhangs, Vegetation to avoid Soil Erosion	Usage of Vernacular Materials for Medicare and Training Centre, Rainwater Harvesting provision, Retaining of On-site Vegetation	In-design Passive Thermal Insulation Strategies, Built up – Void Ratio, Perforated walls, Overhangs, Climate Friendly Design Materials	Biogas Plant on site to produce manure, Solar Panels, Retaining Open spaces and Vegetation
Floor Plan				

Inference

- Mostly all of the structures have made utmost use of available building materials and Vernacular materials with Open space with a view of Interaction.
- Most of the Training Centres have a Medical or Subordinate service Centre attached to itself.
- For Public Spaces, focus is given on Passive Thermal Insulation Strategies.
- The whole structure is climate responsive.

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Healthcare Centre –

All the four Healthcare Centres compared are located in different Contexts and thus the building design and material usage is mostly vernacular to the place. All four of them are small scale medical facilities and two of them are women's healthcare facility.

Project	**Tribal Friendly Hospital Complex in Gadchiroli**	**Women's Health Care Facility and Training Centre in Ouagadougou, Burkina Faso**	**Health Care Facility in Senegal, Tribal Tambacounda**	**Prayer Eye Clinic in Dharni, Maharashtra**	**Rural Medical Facility in Vaitarna**
Type	Tribal Hospital	Women's Healthcare Facility	Maternity Healthcare Facility	Eye Clinic	Healthcare Facility
Location	Gadchiroli	Ouagadougou, Burkina Faso	Tambacounda, Senegal	Kolupur, Dharni	Vaitarna
Context	Tribal/ Rural Context	Rural Context	Tribal/Rural Context	Tribal/Rural Context	Semi-Urban
Site Area	182109 m. sq.	500 m. sq.	3000 m. sq.	2724 m. sq.	2500 m. sq.
Built up Area	750 m. sq.	125 m. sq.	2000 m. sq. approx.		
No. of Storeys	Ground Floored Structure	Ground Floored Structure	'G + 1' Low-rise	Ground Storeyed	Ground Floored
Program		Basic Maternity Medicare, Consultancy		Training Camps for Volunteering	Medical Consultancy and Para-

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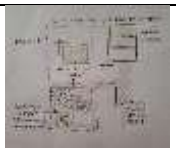
		Centre and Training Centre for Building Administration and Management of CBF		Doctors and Volunteers	Medical Training Centre
Building Zone	Institutional	Institutional	Institutional	Institutional	Institutional
Architectural Context	Brick, Mud and Cement Structure	Load Bearing Structure with Stacked Clay Bricks (made on-site)	Load Bearing Brick Structural and Brick Lattice Work	R.C.C. Framed Structure with future expansion provision	Load Bearing Structure with Bricks, Cement and Corrugated Roofing
Material Palate	Brick, Mud, Cement, Thatch, Bamboo	Stacked Clay Bricks, BTC, Corrugated Aluminium Sheets, Glass Panels, Structural Steel Supports	Brick, Cement, Corrugated Metal Roofing	R.C.C. and Flat Roof	Bricks, Cement, Corrugated Metal Roofs
Structural System	Load Bearing with Bamboo and Thatch used for Courtyards	Load Bearing Structure with Steel Supports for Roofing	Load Bearing	Framed Structure	Load Bearing Structure
Sustainable Strategies	Vernacular Materials, Open Spaces – Courtyards, Renewable Resources, Solar Panels, Biogas Plant, Retaining Vegetation	Vernacular Materials, Open Spaces, Verandahs, Renewable Resources, On-Site Brick Construction, Building Orientation, Overhangs, Vegetation to avoid Soil Erosion	Vernacular Materials made On-site, Solar Panels, Retaining Vegetation	Biogas Plant on site to produce manure, Solar Panels, Retaining Open spaces and Vegetation	Harvesting provision, Retaining of On-site Vegetation
Floor Plan					

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Inference

- Mostly all of the structures have made utmost use of available building materials and Vernacular materials with Open space with a view of Interaction for Public Spaces.
- Most of the Medical Centres have a Training Centre attached to itself.
- For Public Spaces, focus is given on Passive Thermal Insulation Strategies and for proper Treatment Spaces proper care is taken to ensure basic facilities like electricity and water supply are properly dealt with.
- The whole structure is climate responsive along without touching the general and required plan of a healthcare facility.

LITERATURE REVIEW

Initially some researched papers were viewed and analysed to justify the identified problems in the proposed place of Bairagad, Melghat. These research paper were regarding the following topics and practices pertaining to the Tribal region of Melghat –

Health Problems in Tribal Regions and Need to develop a Suitable Healthcare and Training Centre Plan

1. **Health situation of children in Tribal Maharashtra**
2. **Prevailing Maternity Practices and Beliefs in Melghat**
3. **Traditional practices during pregnancy and childbirth among tribal women from Maharashtra**
4. **Antenatal, intranatal and postnatal practices in Melghat tribal area: a qualitative study**

The above mentioned research papers were studied and reviewed –

Review

Poor knowledge and awareness regarding children's diet among the people living in the backward region as well as lack of medical facilities available in these places have all contributed to the prevailing of deadly malnutrition among children in these area. Lack of awareness and training camps due to the non-availability of facilities and services for volunteers and doctors are the reasons, these volunteers avoid going to such places. Awareness camps provide vital information about the diets of children and expecting women for a safe delivery and a healthy baby, these camps are thus important to educate these people regarding the same. Moreover, the healthcare facility structure over these places is very poor as compared to urban areas. These areas lag in getting even basic health facilities as there is no good infrastructure planned to make provision for medical facilities. Thus to conclude, setting up training and awareness centres and spaces for setting up camps are essential for these people.

Figure 41 - Causes of malnutrition

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5. Women's Health in India today : A matter of concern or denial ?

Improving healthcare services architecturally along with education can be the most important intervention to make women aware of their rights, and also prevent them from becoming easy prey to severe emotional and mental disturbances.
Providing employment opportunities for women will also create a positive impact on women's health concerns. Female healthcare providers can play an important role in educating society to recognise their health and nutrition needs as well. And empowering women at all levels would help them to serve as productive members of society and develop healthy generations.

6. Healthcare Access in Rural Regions

This research paper was studied to understand the barriers that the people living in rural and tribal areas have to face.

Rural residents often encounter barriers to healthcare that limit their ability to obtain the care they need. In order for rural residents to have sufficient access, necessary and appropriate healthcare services must be available and obtainable in a timely manner. Even when an adequate supply of healthcare services exists in the community, there are other factors to consider in terms of healthcare access.

7. Impact of Facility Design on Patients –

To address the problems of errors in health care and serious safety issues, fundamental changes of health care processes, culture, and the physical environment are necessary and need to be aligned, so that the caregivers and the resources that support them are set up for enabling safe care.

8. Factors Influencing the Built Environment -

Figure 42- Training camp requirements of a healthcare volunteer

Review

The article states how the physical environment affects the mind of the working staff especially when it comes to institutional building planning and designs like a healthcare facility. The interrelationships between humans, the tools they use, and the environment in which they live and work is basic to any study of the design a health care facility and its effect on the performance of the nurses and other caregivers. A number of factors are essential to be taken into consideration while designing a healthcare unit. Effective visual performances, rapid response to patients and for that a proper and well designed working spaces which would ease out the circulation and access and for that use of natural lighting, effective planning of rooms, using noise reduction mechanism in designs etc., all these factors are very important for the effective working of a healthcare facility.

9. A review on the Literature paper - The Korku Tribe of Melghat Region in India and Their Current State in terms of Amenities and Access, states –

The precarious socioeconomic and development circumstances of the Korkus require immediate attention from policymakers. The vocational training for the youth and women needs to be strengthened. The linkage with the existing government programs would be ideal in this context. Women and youth-

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centered development programs that are locally relevant should be promoted. The options for sustainable livelihood and financial inclusion would be the key to social development among Korkus. The government should focus on enhancing the tribal infrastructure, especially in the domains of education, health, and human resources. The involvement of local self-government should be ensured in all efforts of development. Many people are not enrolled in the various social welfare programs of the state and central government. The collaborations of nongovernmental organizations (NGOs) must be ensured. Intervention programs for combating extreme poverty should be initiated. The people of the region must be sensitized on the regular justice system and the various means of legal services available for them.

10. Rural Health Care System in India

Here, the services given by a Sub-Centre which are mandatory to be setup for a certain amount of population, were studied

Review and Inferences

The sub-centres or being very primary and basic sources of contact between the rural / tribal regions and a properly established community, they work on a very ground level. Very basic and general healthcare facilities like first-aid, maternity and child health services are provided by these sub centres in backward regions. These are essential stops between the backward and under developed community and an advanced medical facility to reach out to these people on the basis of various factors like monetary income, accessibility and lack of awareness. The sub-centres are important to be set for every tribal settlement of around 3000 population.

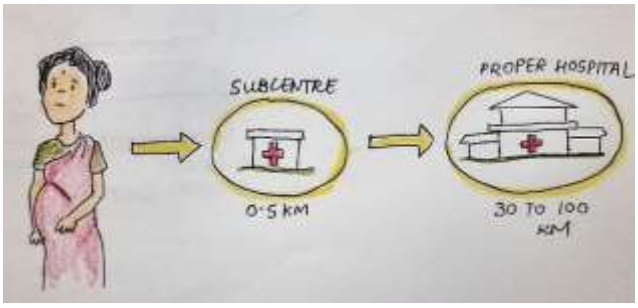

Figure 43 - Need for a Sub Centre

11. Modern Principles and Practice in Planning and Designing of Healthcare Services (An Overview: Latest Trends of Design in Indian Hospitals)

Examples

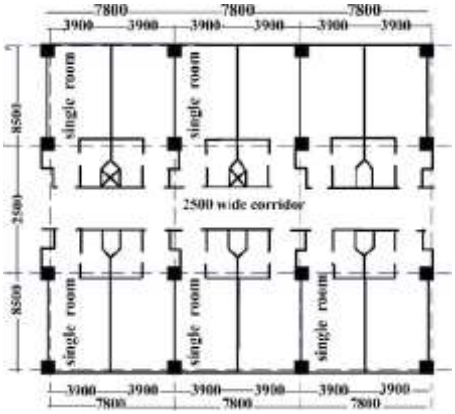

Figure 44 - Structural grid pattern.

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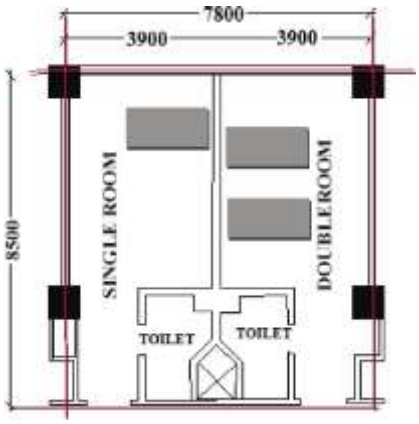

Figure 45 - Grid layout in IPD.

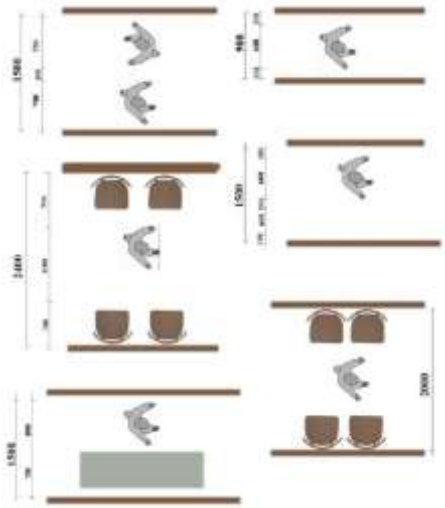

Figure 46 - Movement in corridor passage.

Conclusion

There is no architecture design specially in the field of healthcare architecture which is 100% error free but we can achieve a healing environment in hospital project by minimizing these design errors if due care can be provided. That is possible with fundaments of hospital design. Designing should allow an indeterminacy which is an architecture principle enabling building to grow with order and change with calm.

12. Approaches to Modernizing the Architectural and Planning Structure of Maternity Institutions in the Context of a Pandemic and a New Social Distance

The following study gives examples of different modules of different areas in a healthcare institution and the same was inferred.

Conclusions

- A number of fundamental approaches to adapting the therapeutic environment of the maternity hospitals to the conditions of social distancing are proposed: architectural-spatial approach – in which the boundaries of the spaces of individual functional zones and premises change; environmental approach – in which the communication scheme changes, the environment becomes autonomous, there is a transition from the public to the individual environment.

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- Effective methods of spatial modernization of the functional zones of maternity hospitals are proposed, taking into account the requirements of social distancing and maintaining the therapeutic environment:
    a) The most effective method is construction of translucent, flexible boundaries-partitions of various configurations;
    b) For communicative spaces, waiting areas of the polyclinic department, recreation and recreation areas, the most effective methods are light-coloured, graphic navigation, modelling the environment by placing equipment, furniture, container gardening;
    c) For ceremonial spaces (zones of unloading and delivery of new-borns), the method of 'scenography of space' is optimal using visual communication tools, infographics, as well as 'smooth' boundaries-partitions.

Figure 47- A connecting space for communication

Review and Inferences

The importance of spatial design in the planning of a maternity health care unit as well as different alternatives to enhance the spatial provisions for maternity unit are mentioned above. Physical spatial design as well as visuals are also important to enhance the spatial environment. Separation of spaces using partition walls as well as keeping in mind the recent pandemic situation, the proper planning of communication, waiting and the treatment spaces should be considered. Along with the structural design and spatial planning, the internal planning of the spaces using different aspects for e.g. the furniture placement is also equally important. The separation of visitor spaces, patients and medical staff using any means of design elements along with the utilization of available environmental features for the same could be beneficial too.

13. Health Facility Briefing & Design - Maternity Unit

A general briefing of a maternity unit with all the important as well as allied spaces and how these spaces should spatially be designed is studied

For a proper maternity unit to be designed a brief study of the guidelines regarding the components and design attributes of a wholesomely designed and fully functional maternity unit was done. But, on a small scale i.e. rural/tribal scale the same guidelines and principles mentioned here would be a little lenient and flexible as per the openness of the region. Apart from some essential healthcare services related spatial facilities and provisions, leniency could be amended in the waiting and leisure areas. Maternity units although categorised as Sub Centres, could include areas for the treatment of general diseases as well as illnesses too but, at the ground level. There could also be a model where the first part of the structure could be the treatment of general illnesses whereas the core part of it could go for maternity unit; or else, one part of it would be for general illness ward and one part of it for maternity unit.

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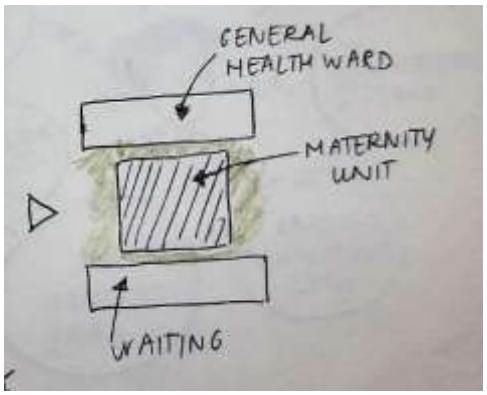

The right module suggests keeping the maternity ward separate from the general ward as the general ward patients should pose any infection to the expecting mothers as well as babies from the maternity unit.

Figure 48 - A schematical diagram where the maternity unit is situated before the general ward

CONCLUSION

Based on the analysed conditions, background and literatures relevant to the proposed thesis, "Women and Children's Healthcare and Training Centre in Bairagad, Melghat", certain aims and objectives for the project were derived.

Aims

- To design a cross-over of architecturally planned healthcare infrastructure model at a ground level covering the preventive and primary measures regarding general women and child healthcare, general basic health care provision , allied training facilities for paramedical staff, training plus awareness facilities for the people (especially the women) as well as rehab and stay facilities for volunteers and doctors; thus to ensure the physical and mental development of the tribal people and create spatial facilities for the volunteers as well as doctors creating better opportunities to reach out to the tribal regions through architectural design solutions.
- To design such a self-sustaining and flexible module/prototype that will regenerate material, fodder and energy to some extent on site for the working of the actual structure as well as creating funds and also to help boost the overall development of the region.

Objectives

- To plan the level of healthcare infrastructure facilities to design pertaining to the chosen area on the basis of the users, background and prevailing conditions of that area.
- Analysing the current health care scenario of that particular region and to study respective healthcare design models made to cater the same.
- To design for the health care needs of women and children of the selected tribal region and architecturally design such suitable spaces.
- To design for the needs and problems (general/infrastructural) faced by the targeted community and look into what kind of architectural solutions could be brought up.
- To analyse current design and planning failure in the current structure and buildings of that region and improvise on the same while designing.
- To design with the help of locally available materials to a greater extent to help make the structure vernacular.
- To plan the structure in a vernacular manner pertaining to the local home structure of the tribals.
- To make provisions for the regeneration of some of the organic materials used in construction to some extent on-site and thus making the design self-sustainable.

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- To design provisions for passive techniques that could be used in design after analysing the climate.

Further on accordingly, the above mentioned aims and objectives were clubbed and framed into Architectural Interventions as follows -

- Designing spaces with respect to the necessary medical anthropometry.
- Architecturally designing spaces such that the actual working and service associated part and the leisure and stagnant part is well differentiated using building, spatial or even natural elements.
- Planning on-site provisions for the cultivation of organic materials used in the structure as well as generation of on-site energy and thus help make the structure self-sustaining to the most extent.
- Designing appropriate barriers between the sick and the healthy using building, spatial or even natural elements.
- Intertwining the built space with natural environment wherever possible.
- Along with providing architectural design solutions on the basis of the necessary health care infrastructural requirements, additional but important criteria including providing for a green and sustainable building to be essentially incorporated.
- Including the use of vernacular materials wherever possible.
- Use of courtyards and open spaces.
- To design a climate responsive structure and try to retain maximum trees and landscape as possible.
- To ensure that hygiene and cleanliness is maintained using appropriate design strategies.

REFERENCES AND BIBLIOGRAPHY

The research pages and literature are citation of some article, online books as well as websites found on the internet. Whereas, the review of literature is been written in the author's own words. Following websites were visited and studied to infer certain information related to the chosen topic. Including all Citations -

For Heath status of the Tribes living in Melghat –

https://www.researchgate.net/profile/Ajeesh-Sebastian/publication/315998685_Traditional_practices_during_pregnancy_and_childbirth_among_tribal_women_from_Maharashtra_a_review/links/59787899a6fdcc30bdc10dbd/Traditional-practices-during-pregnancy-and-childbirth-among-tribal-women-from-Maharashtra-a-review.pdf - for the information regarding the Traditional Practices followed by Tribal women during Pregnancy and Childbirth as mentioned in the Literature Review.

https://d1wqtxts1xzle7.cloudfront.net/19971910/25-26-with-cover-page-v2.pdf?Expires=1626915993&Signature=RyMvk8WuUMl3KQJ7UXen84lGgjL-7nro6aJfgQOL2DlkS7Mec7913pUDrvoCdHrMyiFujnRrhdk3gTKYn6M-x8t3EVHPGDM1DFnX4WT-ybFY2IKoNXXaaXubhpJ8NNi-vfQFs9g3t0YnwTQGwwN0HfInKAPixIC-5NPXJIBlcCqlJIksOO26377GLTXAlg4YKBt0XOc8G18EhhWe3h0jaP~yQGX-LlxAsmNfxF0ZoGlCiMzOZq2HhakNDIq1iunhh9Qu3r1PgVcfJYAE0WsFDtXaE6C9MLyOY6bxkou3Bm0r91Fodxegulz58qU~uxqnnqatqWBR~dIyKk8KthABBw &Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA

For the data regarding Tribal Heath in India -
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