

Green Hospital Initiatives in a Tertiary Care Hospital at Jammu

¹Dr Akshita Abrol, Department of Hospital Administration, Himalayan Institute of Medical Sciences, Swami Rama Himalayan University, Dehradun, Uttarakhand.

²Dr. (Brig.) R.S. Saini, Head of Department, Department of Hospital Administration, Himalayan Institute of Medical Sciences, Swami Rama Himalayan University, Dehradun, Uttarakhand.

³M.M. Mathavan, Facility Director, SMVDNSH, Katra (J&K).

Corresponding Author: M.M. Mathavan, Facility Director, SMVDNSH, Katra (J&K).

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Abstract

Healthcare facilities should provide a therapeutic environment in which the overall design of the building and its site contribute to the process of healing, rather than simply being a place where treatment takes place. The green hospital movement began years ago following the U.S. Green Building Council (USGBC)’s release of their Leadership in Energy and Environmental Design (LEED) standards for building construction. Although initial cost to adopt green practices might be higher but they are the best investment in the facility. Green hospitals have been shown to reduce long-term energy costs. The present study is aimed to study the initiatives taken by a tertiary care hospital toward becoming a climate friendly hospital. The study is an observational study based on WHO Seven directives of a climate friendly hospital. The study was conducted between 8th July, 2021 to 8th September, 2021 at Shri Mata Vaishno Devi Narayana Hospital, Kakryal, Katra, Jammu and

Kashmir. SMVDNSH Hospital has been working towards building a more climate friendly hospital since 2016 and has introduced many energy efficient means like LED lights and purchasing energy efficient products. As a result is the hospital’s total energy consumption has remained steady over the years, despite the increase in patient load.

Key words: Environment, Healing, Climate Friendly.

Introduction

Healthcare facilities should provide a therapeutic environment in which the overall design of the building and its site contribute to the process of healing, rather than simply being a place where treatment takes place. According to the World Health Organization, ‘environments are considered therapeutic (with healing qualities) when there is direct evidence that a design intervention contributes to improved patient’s outcome’.¹

According to Indian Green building council, a green hospital building can be defined as one which enhances wellbeing, aids the creative process, while utilizing natural resources in an efficient environment friendly manner.²

The green hospital movement began years ago following the U.S. Green Building Council (USGBC)'s release of their Leadership in Energy and Environmental Design (LEED) standards for building construction. According to Healthcare without Harm "A Green and healthy hospital is the one that promotes public health by continuously reducing its environmental impact and ultimately eliminating its contribution to the burden of diseases".³

The first initiatives of green hospital was taken by United Nations Conference on Human Environment, held in 1972 at Stockholm which stated that, "the protection and improvement of the human environment is a major issue which affects the well-being of people and economic development throughout the world, it is the urgent desire of the people of the whole world and the duty of all governments".⁴ The concept of green hospital is important as it requires strict cleaning procedure and frequent air changes.⁵

There are mainly seven elements of the green hospitals. These are:

- Dietary service at the hospital
- Water uses at the hospital
- Biomedical waste at the hospital
- Alternate Energy at the hospital
- Green Building Design at the hospital
- Energy Efficiency at the hospital
- Transportation in and around the hospital.

Aims and objectives

The present study aimed to describe the initiatives taken by a tertiary care hospital at Jammu, towards becoming a climate friendly hospital.

Methodology

The prospective observational study was based on WHO Seven directives of a climate friendly hospital. The study was conducted between 8th July, 2021 to 8th September, 2021 at Shri Mata Vaishno Devi Narayana Hospital, Kakryal, Katra, Jammu and Kashmir.

The data was collected from primary and secondary sources of information. A structured check list was used to record the data. The statistical data was analysed through MS excel.

Observation and results

Shri Mata Vaishno Devi Narayana Hospital, a 250-bedded tertiary care teaching hospital at has taken various steps towards becoming a green hospital according to WHO initiatives.

Building Design

The hospital was established in 2016, having a sustainable architectural design. It includes spacious corridors in the hospital, Wards provides ample source of natural light and cross ventilation, Roof Ventilators is used in the cafeteria area, Roof top of the cafeteria is designed as top rise, which provides ample source of light and helps in electricity conservation, use of indoor plants in the hospital. There is an herbal garden spread over an area of 60-70% of open area and consist of trees which provide soothing environment to the patient. An environment friendly approach like preference to STAR rated equipment, Ozone-depleting Substances (ODS) free equipment, mercury free instruments at the procurement stage have been followed in the hospital. More than 70% area of the campus is maintained with

greeneries and natural open spaces for comfort of outpatients and patients. Garden and landscape are an aesthetic delight and promote wellness of patients. Person exposed to plants have higher level of positive feelings.

Lighting

SMVDNSH hospital is designed in such a way that it maximizes day light and optimizes the artificial lighting requirements in all patients' areas. Day lighting is the controlled admission of natural light from the sky (direct and diffused) into a building so as to reduce the use of electrical energy for lighting in corridors /main lobby/reception and other patients' area. Hospital has a glazing facade so as to have both view and daylight. Day lighting has been proven to have positive effects on patients in hospitals. Since 2021, all halogen and CFL inside and outside areas have been replaced with LED lights.



Figure 1: Natural light in the atrium



Figure 2: Day lighting in the ward

The Kaizen study of Hospital and Street lights was also conducted on lights on the basis of productivity, quality and safety. After the kaizen study, LED lighting was installed in all areas of the hospitals. The LED lights were good, cost effective and there was no risk of fire.

Alternative Energy Generation

The hospital has also installed Solar Hot water system, which provides water for washing, bathroom, emergency and Operation Theater.

Biomedical waste

A total of 200Kg of BMW per month is generated which include 30% incinerable waste, 58% autoclavable waste, 10% glass waste, and 2% sharp waste.

All health care workers adopt standard precaution and safety measures while handling and disposing the health care waste. It is transported in separate color-coded trolleys as per the BMW 2016 rules. Biomedical waste audits have been performed to improve waste segregation and reduction.

All infected plastic waste is autoclaved, shredded and handed over to J&K PCB authorized facility. Utilization of recycled water of STP and ETP is done for gardening purpose.



Figure 3: Segregation according to color coding

There was 96.36% of compliance in segregation of waste.

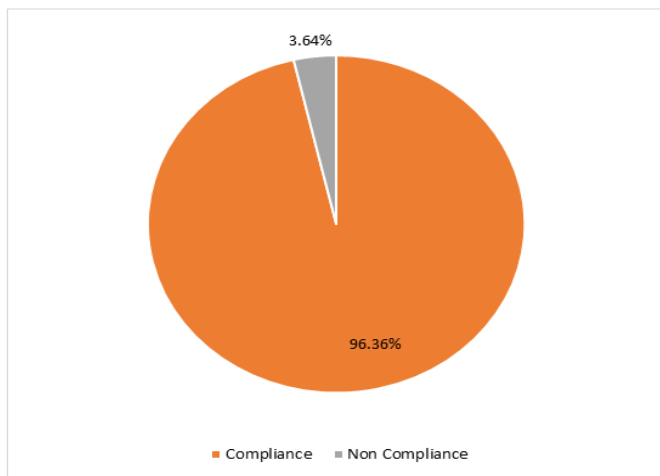


Figure 4: Segregation Compliance (Not required)

Food

Freshly prepared vegetarian food is served in the hospital. Hospital has organic waste convertor. All biodegradable waste – left over food, vegetable and fruit peel are converted into valuable compost that can be used for the organic farming.

Water

Hospital has rainwater harvesting pits, which help replenish ground water. Underground water is used for flushing systems in the hospital and firefighting hydrants. Rain water harvesting pits are used for the collection and storage of rain, rather than allowing it to run off.

For drinking, Reverse Osmosis (RO) based water purifier units are installed in all areas of the hospital for use by staff and public, thus negating the need of bottled water. Hospital has its own STP and ETP plant. Water is treated and used for the gardening purpose.

The water conservation initiatives- low flow aerators, dual flush. Periodic internal/external water audits are also conducted on regular basis.

Housekeeping practices

As part of existing policies, SMVDNSH have written procedures for selection and usage of cleaning products, mops, wipers used for the housekeeping purposes. Usage of glutaraldehyde-based disinfectants is restricted for general housekeeping activities.

Use of VOC based air fresheners are prohibited in the hospital; only water-based fresheners are used. The hospital insists on selection of environment friendly cleaning materials without compromising the patient safety.

Resource

Adequate signages and posters are placed at prominent locations in the hospital area to sensitize the employees and visitors on importance of hygiene and safety. Frequent trainings to housekeeping staff on safe handling and disposal of hospital wastes have been conducted.

Control

The PPE usage is mandatory for housekeeping employee. Separate trained HAZMAT team has been provided for handling hazardous material and chemical spills. The cleaning material that meets environmental standards without compromising the patient safety has been selected in the hospital.

Indoor Air quality- Active and Passive measures

Engineering department of the hospital is doing air quality and noise level monitoring testing in hospital and also facility is doing regular waste testing of STP and ETP. Regular pollution monitoring / Air testing of stack emission for DG sets and boilers have been conducted. Air culture testing in indoor patient's area including ICUs has been done regularly. A Monthly facility audit/round to ensure safety & quality in place have been conducted.

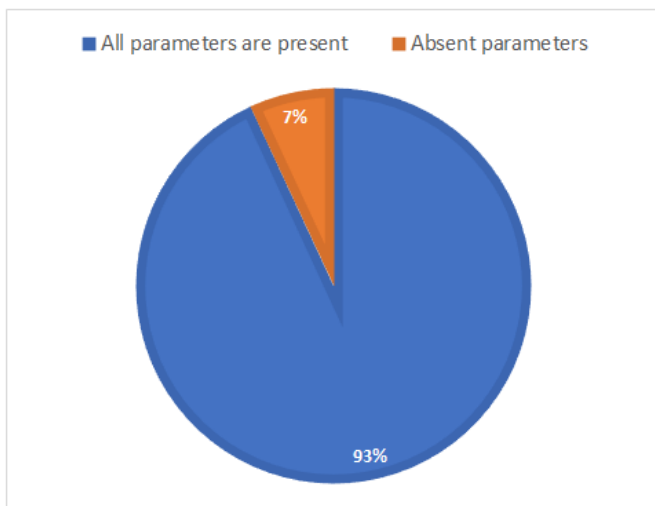


Figure 5: Analysis of check list by %.(is it required)

The absent parameters were:

1. Do you recycle waste including plastic?
2. Do your actively detects leak. These two lines not required.

Discussion

In India, National Green Tribunal (NGT) has directed hospitals to reduce energy consumption through third party audits or relevant assessment studies.

SMVDNSH Hospital has been working towards building a more climate friendly hospital since 2016. Hospital has introduced more energy efficient means like LED lights and purchasing energy efficient products. The result is the hospital's total energy consumption has remained

steady over the years, despite the increase in patient load.

WHO recommends incorporating green building principles in design and construction. The National building code of India has stressed upon the importance of natural light and ventilation, green building design, solid waste management, availability of local public transport system and installation of energy efficient systems in healthcare establishments to reduce Health sector's carbon foot prints.

Future Prospects: There is ample amount of sunlight, which can be captured. Solar energy can be utilized more. Facility has a plan for installation of 200 KW solar energy systems in the year 2022-23. Facility has a plan for installation of Hot water generator (Electric) and Steam generator.

Conclusion

The hospital has initiated various steps towards becoming a green hospital. Hospital provides its commitment towards conserving natural resources and contributing to the environment. Further training and awareness programs of employees and possibility of telemedicine should be considered. Healthcare professionals should take a pledge to contribute towards building a carbon neutral or carbon negative healthcare facility and work towards becoming carbon literate.

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