



PLANNING AND DESIGNING PERSPECTIVES IN QUALITY MANAGEMENT

Healthcare

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ABSTRACT

Hospital Planning and designing has immense implications on the quality of healthcare services being provisioned. An attempt has been made to discuss some important issues related to rational and scientific planning and designing of hospitals, the recommendations by reputed bodies like NABH, Bureau of Indian Standards and various guidelines and analyse how it translates into optimum of quality of healthcare services. The Distribution/ Grouping of facilities, Zoning of facilities, Appropriate Design, Appropriate Material, Signage and Wayfinding, Appropriate Engineering controls, Appropriate Physical Design and the Provision of services all have an impact on the efficient planning and design of healthcare facilities and the same have been discussed in this article.

KEYWORDS

Hospital Planning, Healthcare services, Hospital designing

INTRODUCTION

Holistic and rational planning and designing of healthcare facilities lays the foundation of future efficiency in quality management. Unfortunately, however, due attention is not paid to standard evidence-based guidelines, recommendations with regards to distribution/ grouping, zoning, interdepartmental relationship, flow of traffic, use of material, internal fit and finish of facilities and appropriate signage amongst various aspects which later on have serious implications with respect to provision of quality services. The National Board for Accreditation or hospitals and healthcare providers (NABH) has, thus recognizing the importance of good planning and designing in quality management which in turn reflects through the appropriate layout of facilities, appropriate materials, fit and finish, included a number of objective elements in its accreditation standards [1]. An attempt has been made in the succeeding paragraphs to outline various parameters crucial in the hospital planning and designing which has implications with respect to quality management perspectives.

Distribution/ Grouping Of Facilities

The rational distribution/ grouping of various facilities within the healthcare institution is highly essential as incorrect grouping of the departments/ activity areas will not only interfere in the smooth and correct flow of various traffic but also affect their efficiency and may also put the patient/ staff/ visitor at increased risk. Thus, inpatient accommodation especially the high dependency areas should be segregated from the outpatient areas/ diagnostic facilities. Similarly, the Operation theatre department should be segregated from outpatient areas and in close vicinity to Intensive care unit. It also essential that there be a functional or system wise grouping of facilities or department rather than an artificial grouping based on medical or surgical divisions as happens in many government or service hospitals. For example - the neurology department should be in close vicinity to the neurosurgery. Similarly, the cardiology OPD/ department should be in close vicinity to the cardiothoracic surgery department. This will not only facilitate inter departmental communication and consultations which so often happens in the case of such specialties but also saves the patient unnecessary travel, movement, enquiry and guidance to go from one speciality to another. The CSSD located in close vicinity of OT/ ICU will also prevent movement of sterile goods through heavy traffic areas and thus have beneficial implications with respect to hospital associated infections.

Zoning Of Facilities

One of the basic principles of hospital planning and designing is control of traffic or movement, i.e. segregation of traffic (patients, staff, visitors and stores) from areas where patients are housed who are at increased susceptibility to infection. This allows creation of certain zones where only staff and clean traffic can enter. The zoning of facilities although most apparent in Operation Theatre department, ICU, NICU/ PICU, CSSD, should also be incorporated in areas like Dietary services or kitchen (segregation of normal traffic from preparation areas), hospital laboratory and High dependency units, transplant units, chemotherapy units etc. The fifth edition of NABH

Standards also incorporates space and appropriate zoning including separate areas for receiving, washing, cleaning, packing, sterilization, sterile storage and issue and a unidirectional flow as an important component of CSSD and the same has been made part of the objective element HIC 7a. The zoning of facilities coupled with different partial pressures of air flow and different air handling units in places goes a long way in prevention of airborne infections.

Appropriate Design

Of healthcare facility especially with respect to various building byelaws and National Building Code, 2016 [2] is very essential. It is essential to be conversant with the permissible height of the building, which in turn may be restricted by aviation authorities and the fire department. Their guidelines and the municipal building byelaws have implications on the total plinth area available and subsequent layout and design of the facility. Provision of perimeter road for fire tenders to go around the building is essential as per NBC 2016 and the same has been due importance by the accreditation authorities too. Having adequate access for ambulance to reach the Accident and emergency services is also recognized by NABH vide COP 3b. The provision of ramps for elderly and disabled patient, fire exits, separate lifts for patients/ stores, length of corridors, correct distribution of areas within a department all have implications on future provision of quality services. It is also important to have key areas in certain departments like a play room and breast-feeding room in pediatric care facility which not only improves the ambience of the facility but is also essential in enabling the patient in having a healing experience. Provision of natural light and good view in inpatient areas/ wards also contributes towards the same and has been recognized as an important part of evidence-based design [3]. It is also important to incorporate the cultural nuances of patients by provision of say a place of worship for the patients/ attendants and the same has been recognized in the objective element PRE 2a of NABH 5th edition.

Appropriate Material

It is very important for a qualified hospital/ healthcare administrator who has deep understanding of the functions to be performed in a particular department to be involved with the engineers/ architects during the construction of the facility. At times, the material which is used in an area is aesthetically pleasant, but may not be appropriate in terms of the functions to be performed there. Thus Marble, which has a low rating on the Measure of hardness scale, corrodes easily, requires frequent maintenance, and will not be the suitable material for areas like Operation Theatres, Waiting areas in OPDs etc. Carpeting is also discouraged in healthcare facilities on account of their property of harbouring dust, pathogens, allergens etc. Vitrified tiles may look good but because of their joints may not be suitable for OTs. Fall incidents are a leading safety concern in the hospital industry. Whereas roughening the floor surface can reduce fall risks, there remains unanswered controversies between achieving and maintaining hygienic cleaning efficiencies and adequately addressing conditions of flooring safety [4]. Acid/ Alkali resistant tiles, although not very appealing from the aesthetic point of view but may be essentially

required in a hospital laboratory. At places where there is likelihood of provision of care to vulnerable and elderly age group patients, the organisation should ensure the provision of a safe and secure environment by use of anti-skid tiles for elderly, ramps with railings for disabled, etc. The same has been included in objective element COP 16b. The use of fire retardant/ resistant material in places may also be required for obtaining clearance from fire authorities.

Signage And Wayfinding

Appropriate bilingual signage along with symbolic depiction through use of signboards, or glow signs or layout charts, fire escape routes etc. at appropriate places duly showing not only the facilities of the hospitals but also defines the services being provided by the hospital is essential. The same is given due importance by the NABH standards too in the patients' rights and education and also in the Facility management and safety. It is also essentially required for providing a barrier free environment [5 & 6].

Appropriate Engineering Controls

Use of the appropriate ventilations systems with correct rate of air exchange, air handling units, filters, water filters including RO filters for drinking purposes, generators and UPS for uninterrupted power supply to essential areas, liquid oxygen tanks and gas manifold for central piped medical gas supply sited appropriately and adhering to recognized guidelines and standards (ISO, BIS, HTM etc) is essential for provision of quality services. Issues such as AC plant & eqpt maintenance, cleaning of AC ducts, AHU, replacement of filters seepage leading to fungal colonization, replacement and repair of plumbing, sewer lines (in shafts), also require due importance. Water supply sources & system of supply, testing for water quality, must be included. Any renovation work in hospital patient care areas should be planned with infection control team with regard to architectural segregation, traffic flow, use of materials etc. [8].

Appropriate Physical Design

The importance of the environment as a reservoir for microorganisms implicated in disease transmission in the hospital setting has been increasingly recognized, especially with respect to dialysis units, ventilation in specialized areas, and the proper use of disinfectants [8]. Inherent within the environmental setting is the importance of physical plant design. Several studies have underscored the importance of optimizing design standards to maximize patient and health care worker (HCW) safety, including the prevention of hospital-acquired infections in patients [9,10,11,12,13]. Ulrich et al (14) recently completed an evidence-based review, entitled '*The role of the physical environment in the hospital of the 21st century: A once-in-a-lifetime opportunity*', for the Center for Health Design in California (USA), which was funded by the Robert Wood Johnson Foundation. Ulrich and colleagues identified over 600 studies that examined the hospital environment and its effects on staff effectiveness, patient safety, patient and family stress, quality and costs. They suggested that one of the important elements in improving patient safety is the reduction of the risk of hospital-acquired infections through improved facility design.

Provision Of Services

Like hand wash facilities, handrails (in ramps & disabled friendly toilets/ lifts), ramps, hermetically sealing doors in OTs, airlocks and air curtains in OT & ICU, etc has enormous implications as regards provision of quality services in healthcare facilities.

CONCLUSION

The above-mentioned planning and designing factors are not in any way a complete list and due attention is required to paid at each and every stage of the healthcare facility planning as well as construction phase. As an old adage goes, "God lies in the details". Hence visualizing the healthcare facility as a systems concept and recognizing the interrelationship between different sub systems is critical to a holistic, functional and efficient plan.

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