PRINCIPLES IN DESIGNING THE HOSPITAL BUILDING

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Abstract

Special attention and provisions must be done when designing and building a hospital. Designing a hospital that satisfies those criteria are difficult, but not entirely impossible. Extra effort in adhering to specific rules and regulations of Ministry of Health, especially when integrating latest technology in the hospital design are challenging. Therefore, based on the above dilemma, this paper discusses the principles in designing an optimum hospital, which able to accommodate the present and future needs of hospital capacity.

Keywords: Design, elements, hospital building, hospital planning, principles.

I. Introduction

Several laws and regulations namely, Private Healthcare Facilities and Services Act (PHFSA) under Malaysia’s Ministry of Health (MOH) govern development of hospitals In Malaysia. PHFSA provides guidelines for hospital building such as dimension of room to the number of nurses required for each services, such as to serve patient in Intensive Care Unit (ICU) and others [VI-VIII].

This paper addresses the principles of designing hospital used in building hospitals that meet the expectations of stakeholders, patients, medical staffs and visitors whilst abiding to PHFSA at the same time [I-V].

II. Findings

Findings in this study derived from researcher’s own experiences developing more than 20 hospitals [IV]. Based on his own observation and reflection, the
followings are the six (6) principles or considerations, which are vital in designing a
hospital. Besides the identification of relationship between five elements and nine
variables in hospital planning, a planner considers the following 6 principles to design
a hospital that not only functional with its aesthetic value but meets the stakeholders’
expectations. The principles are not in chronological order but are integrative in
nature (refer Figure 1 below).

Fig. 1: The Principles in Design of Hospital Building.

A. **Principle 1: Safety and Security**

A hospital building must be safe for the use of patients, staffs and visitors
while maintaining privacy at the same time [VII]. Security is achieved through the
establishment of security service or installation of access card mechanism on doors or
entrances of each wards and medical records unit. At the same time, awareness on
patient’s record security can avoid any pitfalls of mishandling of records and medical
errors.

The safety and security culture includes hospital environment, facilities and
equipment. The hospital management must ensure that any disposals of waste from
kitchens, clinical sinks and used disposable items are well managed to control
infections and pollution of hospital environment.

As for facilities and equipment, proper measures during construction, installation
and usage must be adhered [IX]. For example, a Radiology staffs wears proper attires
and follow strictly radiation warnings to avoid radiation exposure from x-ray
machine. Another example, the usage of barium plaster at walls with certain thickness
at Cathlab, X-Ray and CT-Scan room serve as protection from radiation emission.

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A hospital building should have proper disaster management plan. For instance, an allocation of refuge area at every floors, fire assembly points and installation of fireproof doors within the building are parts of its disaster contingencies. Another example includes the installation of generator (genset) and uninterruptible power supplies (UPS) for power outage contingencies.
B. Principle 2: Circularisation & Accessibility

A hospital building must have proper flow to cater stakeholders’ needs in terms of delivering services, managing traffics or providing good air ventilation. According to PHFSA, hospitals must have 5 dedicated entrances which are for patients/visitors and public to walk-in; patients with disabilities (wheelchairs/stretchers) to get access, emergency (critical and non-critical area) drive-in; body hold (mortuary) and service entrance for kitchens, storages, domestic and clinical wastes.

The allocation for these 5 entrances is a primary requisite in the beginning of hospital development, that is during the zoning application to Ministry of Health (MoH). The rationale is for easy accessibility and movement of respective stakeholders and infection control in preventing the spread out of illnesses or bacteria to others.

During the design stage of a hospital, a planner considers every department’s existence to ensure proper location, easy access and connectivity. For instance, the Diagnostic Imaging Services is located near to Accidents and Emergency Department (A&E), so that referring patients to do X-Ray or get medicines from a pharmacy and pay the medical bills are close by.

![Diagram of A&E and Radiology Department](image)

**Fig. 5:** An example of the location of A&E and Radiology Department.

However, there would be occurrences where certain services would require segregation or separation of location based on their nature of service. An example would be the *segregation of critical and non-critical zone* at A&E in accordance to the existence of triage, Yellow, Green and Red Zone. There is also *segregation of patient and non-patient area* as seen in the Isolation Room. There is an empty area, where non-patients could prepare themselves with protective gear before entering the Isolation Room for visiting infected patients. The two areas have different adjusted air pressure to contain bacteria within the room.

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The segregation area include Support Services such as the provision of bed linen, housekeeping staffs and supplies as well as waste management activities. In addition, separation of activities comprise of separating clean from dirty linen and clinical waste from general waste. Whereas, separation of flow dedicates for food delivery, waste collection and dirty linen collection where certain departments allow performing of tasks at a scheduled period.

C. Principle 3 : Expandability & Flexibility

During a project brief and concept, a developer strategizes the development of hospital by phases. For example, a developer will develop 60 beds during the first phase and the balance of 40 beds in the second phase. Thus a developer has two options, whether to develop the structure for 100 beds, but fitted-out only 60 beds, or develops the 60 beds first and the rest of 40 beds later.

The developer needs to consider the conversion for alternative service where location of services or departments may changeable in the future. For instance, the Finance Department that is previously located at Ground Floor during the first phase can be relocated to the sixth floor during the second phase. Hence, the Mechanical and Engineering (M&E) services must accommodate any changes of floor usage due to future renovation or expansion.

D. Principle 4 : Efficiency

Efficiency in terms of energy and operation are embedded in design of hospitals so that energy, gas and water are consumed efficiently. In reducing cost of operation, hospital design incorporates natural light on window panels as an alternative for lighting and provides rain-harvesting system for watering plants.

Meanwhile, proper positioning of departments, allows efficient movement of medical staffs. For example, a billing clerk stations at the nurse counter to improve communication among staffs, patients and visitors during billing process.

Fig. 6: An illustration of the expansion of KPJ Johor Specialist Hospital.
allocating larger workspace, for Maintenance Services would also allow adequate maintenance equipment be stored and kept properly.

E. **Principle 5 : Hygiene**

Hygiene management is very important since the hospital is the hub for illnesses, virus and bacteria. This matter requires good and proper ventilation system, efficient housekeeping management, proper linen management, food preparation and pest control, which reflect good infection control.

F. **Principle 6 : Aesthetic**

Since patients and medical staffs spend most of their time at hospitals, it is sensible to design a building that has curative and healing environment through sight, hearing and sense. For instance, a good hospital design includes garden or pathways with greeneries to induce patients’ minds to be calmer and relax. The Paediatric Ward should be painted colourful with space or playground so that younger patients can have fun while undergoing treatments.

![Fig. 7: An example of colourful paediatric ward at Kedah Medical Centre.](image)

A good aesthetic value of hospital design include quiet area and soothing environment for praying and meditation. Nowadays, most hospitals provide prayer rooms and mini gardens for this purpose.

Finally yet importantly, a hospital design caters for human needs so that patients feel comfort and so as visitors. A proper room with good amenities such as washrooms that cater for patients with disabilities make pleasant staying for patients.
For example, washroom should provide handrail, well lighted and ventilated for disabilities patients. The rooms provide adequate privacy and the nearby waiting area have plenty of seats for visitors.

**Fig. 8:** An example of the installation of grab bar in the washroom (Kedah Medical Centre, Kedah).

**Fig. 9:** Room at Prince Court Medical Centre, Kuala Lumpur.

### III. Conclusion

Hospital is the gathering place for patients, medical staffs and visitors. Hence, it is very important for planner to take incorporate the six principles in designing hospitals that are not only safe, secured, accessible, hygienic, comfortable and functional as well as fulfil the expectations of the stakeholders.
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