

## ASSESSMENT OF THE DESIGN AT THE PRIVATE HOSPITAL'S DEPARTMENTS AND THE GOVERNMENTAL HOSPITAL 'S DIALYSIS DEPARTMENT

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### ABSTRACT:

Hospital managers and facility planners are drawing on evidence-based design of hospitals to increase the likelihood that new facilities will generate the expected outcomes and the likelihood of designing facilities that function well for patients and staff and are cost-effective. The aim of this research is to assessment of hospital departments' design according to national & international standards. All ministerial specifications related to the engineering design of hospitals were reviewed and compared with the international standards. A verification form was prepared in order to be applied for assessment of dialysis department in a governmental hospital and all departments of licensed private hospital in the governorate.

**Keywords:** hospital managers, evidence-based design, national standards, approved design standards.



### INTRODUCTION:

There are several reasons for the interest and emphasis on using formal research to guide facility decision-making in the health care sector. To increase the likelihood of designing facilities that function well for patients and staff and are cost-effective, hospital administrators and facility planners are drawing on evidence-based design to increase the likelihood that new facilities will generate the expected outcomes. <sup>(1)</sup>

Nowadays, hospitals and their managers are dealing with a host of daunting and often competing demands: unpredictable reimbursement, work-force shortages, skyrocketing costs, increasing disclosure requirements, mounting consumer and employer expectations, and aggressive union tactics. Most important, a quality and safety revolution is sweeping the country. <sup>(1,2)</sup>

Consumers, employers, and payers are

demanding that hospitals dramatically reduce system-based errors that harm, even kill thousands of patients annually. <sup>(3)</sup>

Hospital managers are now beginning to face a new reality: They can no longer tolerate preventable hospital-acquired conditions such as infections, falls, and injuries to staff or unnecessary intra-hospital patient transfers that can increase errors. <sup>(4)</sup>

Nor can they subject patients and families to noisy, confusing environments that increase anxiety and stress. They must effectively deploy all reasonable quality improvement techniques available. To be optimally effective, a variety of tactics must be combined and implemented in an integrated way. Hospital leadership must understand the clear connection between

building well-designed healing environments and improved healthcare safety and quality for patients, families, and staff, as well as the compelling business case for doing so. <sup>(5,6)</sup> In 2015, operational infrastructure data were collected via an online questionnaire from ICUs participating voluntarily in the German nosocomial infection surveillance system (KISS). A multivariate analysis was subsequently undertaken with nosocomial infection rates from the KISS database from 2014 to 2015. Findings indicated that in total, 534 ICUs submitted data about their operational infrastructure. Of these, 27.1% of beds were hosted in single-bed rooms with a median size of 18 m<sup>2</sup> (interquartile range 15–21 m<sup>2</sup>), and 73.5% of all ICU beds had a hand rub dispenser nearby. The authors were able to match 266 ICUs in the multivariate analysis. ICUs with open windows in patient rooms were associated with lower device-associated lower respiratory tract infections [odds ratio (OR) 0.73, 95% confidence interval (CI) 0.58–0.90]. ICUs with >40% two-bed rooms were associated with lower primary bloodstream infection rates (OR 0.66, 95% CI 0.51–0.86). <sup>(7)</sup>

## **MATERIALS AND METHODS:**

The aim of the current study was to assessment of hospital departments' design according to national standards and approved design standards.

As part of its health strategy, the Syrian Ministry of Health has developed standards and specifications for the design and planning of hospitals. <sup>(8,9)</sup>

These standards do not take the form of a formal code, since the existence of such a model facilitates the design and planning process and increases the quality of the health facilities to be implemented. In order to cope with the tremendous development of treatment methods, it was necessary to develop hospital planning and design. With this development there is a set of general principles that must be applied to all hospitals and health facilities.

Usually, when thinking about constructing new buildings in a hospital or redesigning existing buildings, the benefits and practicality of procedure are taken into consideration. Here, the quality of the current demand for health services and the future direction of the size of facilities needed for the site, the financial situation, and the capabilities that must be available for this work such as machinery and equipment and the preparation of staff should be determined. Above all, the basic goals of the hospital should be defined.

These goals may be affected by health objectives at the local or regional level or by the type of hospital selected for construction. The government hospital that serves the community is also affected by the goals and the general government policy, so the objectives of this hospital will certainly be different from the objectives of a private hospital or a hospital that volunteers in the form of offering aid without the aim of making a profit.

### **General Engineering Specifications:**

A. Exterior architectural specifications:

- The building is carefully thought out and supported to protect against natural disasters to the degree determined by specialists
  - The ground floor area should not be less than (300 m<sup>2</sup>).
  - Building Entrances:
    - A main entrance for patients.
    - A service entrance that can be reached by cars
    - Emergency entrance to the emergency department separate from the main entrance.
      - Entrances and corridors are provided for the smooth movement of people with disabilities, patients, and injured people (ramps, built-in and non-slippery sidewalks).
      - The movement of people and cars should be well thought out and easy within the hospital.
      - The facility design shall ensure security and safety conditions from risks and accidents (guard, exits, and fire-escape stairs).
      - Drainage systems and rain gutters for roofs and balconies.
      - Entrance and exit doors opening should allow a net space of no less than (160 cm).
      - The size of the patient's room windows equals eighth of the room's floor space.
      - Demarcating the territory of the hospital
- B. Interior Architectural Specifications:
- Specifications of stairs and ramps:
    - It's a one-floor hospital that does not require stairs.
    - Width of stairs should not be less than (125 cm) and width of the landing at least (125 cm).
    - stairs with a comfortable pitch line (the tread is 27-30cm deep and 15-18 cm high).
    - Special corridors are available for people with disabilities and patients (standard ramps).
    - drainage water management is provided and directed.
      - Specifications of elevators:
        - The hospital is one-story and does not need elevators.
        - The hospital is multi-level and needs elevators in proportion to the size of the hospital and its needs. The minimum number of elevators is determined in accordance with the number of beds as follows:
          - One elevator for patients for a hospital with a capacity of 25 beds maximum.
          - Two elevators for patients for a hospital with a capacity of 26-50 beds.
          - Two elevators for patients and an elevator for visitors to the hospital with a capacity of 15-100 beds.
          - Two elevators for patients and an elevator for visitors to the hospital with a capacity of 101-200 beds.
          - An additional elevator for patients for every additional 50 beds above the 200.
          - The design of the elevator shaft should provide at least the

minimum acceptable dimensions of the required elevator dimensions which are:

- Patients elevator: The net cabin interior is (140 \* 240 cm) and the door opening is not less than (120 cm).
- Visitors elevator: The net cabin interior is (120 \* 120 cm) and the door opening is not less than 90 cm.
- Specifications of corridors:
  - The width of corridors leading to emergency and operating departments is not less than (240 cm) and the rest of the corridors used by the patients are not less than (180 cm). No manifest installations are planned. In case a false ceiling is planned, its height should not be less than (240 cm).
  - The number of corridors available in the hospital should correspond to its area. corridors should provide the necessary horizontal movement required (there should be no crowding, there is a waiting room for the events that require it, ..).
  - The corridors include rooms or halls for cleaning services and workers.
- Specifications of bathrooms and toilets for patients:
  - The bathroom designed for the patients' use should not be less than

(2 m<sup>2</sup>); one of its dimensions should not be less than 1.25 meters, and its door shall not be opened inwards.

- Bathrooms are available for the use of people with disabilities at a rate of one for every twenty beds. The bathroom area is not less than (4 m<sup>2</sup>).
- At least one bath is available for patients in hospitals above 50 beds and its area is at least 8 m<sup>2</sup>.

### **Engineering Specifications for Functional Services:**

The design should be appropriate and provide the ideal location and proper operation method of the systems to supply at least what is minimum required.

- Supply system and electric devices:
  - There are plans to provide the hospital with backup power stations, and the generator's location is soundproof.
  - Electric equipment, transformers and panels are distributed geometrically within a separate, safe and protected area.
- Sweet water supply system:

- The hospital is supplied by a line from the main network of the administrative unit.

- The construction plan takes into consideration the availability of backup water tanks that meet the regular conditions of health (sealed tanks) and that are sufficient to cover the needs of the hospital for a period of not less than 48

hours for not less than half a cubic meter per bed per day.

- Plan a suitable desalination or filtration site with a proper capacity in the vital sections of the hospital (laboratory, blood purification, intensive care, steam sterilization).

– Saline Water and Solid Waste Management System:

- The design of saline water drainage network is connected to the general sanitation network in a systematic way according to the conditions of the authorities responsible for sanitation.

- The sewage water of the hospital does not flow on to the neighborhood.

The Drainage Plan includes a sewage treatment unit that works in accordance with the applied regulations, the number of beds and the quality of work in the hospital for the treatment of liquid waste prior to entering the sewers.

- There is a place to safely isolate, assort and collect hazardous and non-hazardous medical solid waste before deportation in accordance with the governing laws and regulations.

– General ventilation system:

- The engineering plan is aware of the importance of ventilating the necessary facilities (toilets, kitchen, boilers, washing, sterilization ...) with a suitable central system (pumping and pulling air) if the natural ventilation system is not available.

- Heating system: The engineering plan should provide a central heating system covering all sections of the hospital.

- Air conditioning system: The engineering plan takes into account the availability of a central cooling system for the main sections of the hospital (operating rooms, intensive care, sterilization ...).

– Equipment for Mechanical services:

A - Engineering Plan:

- Equipment (steam boilers - tanks - heating system- central air conditioning - desalination plants ... etc).

- Secure their needs easily (black oil , spare parts, ... etc).

- Fuel tanks for this equipment are of appropriate capacity to provide sufficient backup for the hospital to be available for at least two weeks.

B. Medical gases:

- The hospital includes two sources of oxygen supply (primary and secondary).

- The warehouse of the supply of medical gases is designed in a way as not to cause any noise to the hospital or neighborhood. It is connected to the hospital in a way as not to cause damage if an explosion happens. The force of the explosion should be directed as not to cause any harm.

- The oxygen cylinders are connected to the gas supply tank easily.

C. Fire protection:

Provides life-saving systems according to the governing system of the governorate, and the fire escape stairs must be easily accessible.

### **Annex III: Engineering specifications for service, technical and administrative departments:**

The various sections of the hospital are required to operate almost optimally, but the following construction specifications are the minimum acceptable features for procuring a license.

Mandatory sections:

– Residential Accommodations:

Patient Rooms: Each room has ventilation and natural lighting.

- The one-bed room is not less than (10m<sup>2</sup>) without health devices and not less than (32m<sup>2</sup>) after coating.

- The room for more than one bed: the area for one bed is not less than (8 m<sup>2</sup>) without the health devices and without children and infant incubators it is not less than (4 m<sup>2</sup>).

- Maximum number of beds per room is two beds, incubators not included.

- The windows of the room are not less than eighth of the floor area of the room.

- Each room has a private bathroom according to the aforementioned specifications.

- There is at least one isolation room ventilated by negative pressure and is accessed through double doors and has the means of protection and hand washing.

Patient Suite: the number of beds per suite is 30 beds maximum.

- A suitable reception and nurses center are available including: a reception desk and a private work station for nurses with a minimum area of (10 m<sup>2</sup>). The nursing location provides good supervision of the

department. (in the nursing station there should be room for: a wash basin, storage area, dressing cart, refrigerator, and Emergency cart)

The doctor's room: a special room for the doctors responsible for the floor to rest and meet patients' companions. It should not be less than (8 m<sup>2</sup>).

Bed Linen Depot: The bed linen for the patients and the minimum area is (4 m<sup>2</sup>).

a place for cleaning tools: on each floor there is a closed place containing cleaning tools and materials with an area of not less than a square meter.

waiting area: A seating area of half a square meter for each bed, with a minimum area of (12m<sup>2</sup>), which can be distributed over several places where no beds of the sick exist.

10% of the total public toilets shall be allocated for the use of people with disabilities and patients with an area not less than (4 m<sup>2</sup>). There should be at least two of them in hospitals with more than 30 beds.

bathrooms for staff working in the suite.

### **RESULT:**

A. **SWOT analysis** (alternatively SWOT matrix) is an acronym for *strengths*, *weaknesses*, *opportunities*, and *threats* and is a structured planning method that evaluates those four elements of an organization, project or business venture. <sup>(10)</sup> The following matrix shows the SWOT

analysis on the subject of ministerial specifications:

### B. The Comparison between ministerial specifications and design standards adopted in hospitals design:

<p><b>Strengths</b></p> <ul style="list-style-type: none"><li>-There are ministerial specifications that adopt the international standards for the design of hospitals documented and issued by the Ministry of Health.</li><li>-The Ministry is currently ready to update and reorganize the laws.</li></ul>
<p><b>Weaknesses</b></p> <ul style="list-style-type: none"><li>-There is no one file that includes the ministerial standards for the design of hospitals, but successive decisions are made to determine the design specifications of particular departments in hospitals, such as (Fertilization center – Bone Marrow Transplantation Centre).</li><li>- No committee is set of different specialties to review and decide design specifications, in which administrative, medical and engineering representatives take part.</li></ul>
<p><b>Threats</b></p> <ul style="list-style-type: none"><li>-There is no coordination between the relevant public authorities (housing - health - higher education) in terms of design standards.</li><li>-Challenges facing the health sector in the current stage as health institutions are attacked and destroyed by terrorist groups.</li></ul>
<p><b>Opportunities</b></p> <p>Establishing the Ministry of Administrative Development which aims at reviewing and updating regulations and laws through administrative development units in each ministry.</p> <p>The establishment of new alternative health facilities to compensate for out-of-service facilities, with the support of the government and international organizations (WHO).</p>

By comparing the ministerial specifications for hospital construction and the approved design standards, (11-15) the following is indicated:

- There is no classification of hospitals in the specifications of the ministry while hospitals are classified in international standards depending on their size (large - small - medium), type (specialized - general - teaching) and in terms of specialties.

- Hospital orientation and location are important standards that are considered in design because they directly influence the effectiveness of this construction. It is important to mention them as items in the standards section.

- The breadth of hospital service should be determined. This is stated in the international standards, where the range is determined by region, population and other factors.

- The detailed description of the dimensions (dimensions of rooms and their depth in addition to all equipment and devices) makes the design as precise as possible. It is important to mention them as a standard item.

- The overall size of the hospital is calculated by calculating the full size of each bed. Adding such information makes it easier to calculate the full size of the hospital.

-The Ministry's specifications do not mention how beds should be arranged and distributed.

- The conditions of natural lighting and ventilation were not mentioned in the ministerial specifications.

-For operating rooms, the number of operating theaters to the number of hospital beds was not mentioned.

### **Examples on the comparison between ministerial specifications and approved design standards:**

Design standards that are not included in the ministerial specifications of inpatient service are in general:

Arranging and distributing beds: A row of beds can be placed with a side passageway or two rows with a passageway in the middle crosswise. In depth, we can put one bed. Often we can put two or three beds perpendicular to the axis of the room or one bed Or two parallel with this axis. Each bed should be removed from the room without the obstruction of the patients'. In case there was one row of beds, the room's width is at least 4.5 m. In case there were two rows of beds the room contains 4 beds, then the room's width is at least six meters. In case there were two rows of three beds in a room of six beds, the room width is at least 6.25 m with a modulation of 1.25 m. In case of a three-bed room, the width of the room should be at least 3.75 m with a modulation of 1.25 m or 1.875 m, preferably 8 meters.

### **Depth of rooms:**

The depth of rooms depends on the distribution of beds. The depth ranges from 3 to 6.5 m. However, if the daylight rays enter from both sides, as in the halls, the depth ranges from 7 m to 9 m. Costs of construction and investment can be reduced by reducing the length of corridors and passageways. The deeper the room, the greater its capacity.

The thickness of the partitions between patients' rooms is 25 cm while partitions should be approximately 12 cm minimum, taking into consideration the required soundproofing.

- The doors should be made to close quietly and tightly on four sides. They are usually made of wood and steel-coated from the bottom with a rubber insulator of sound and dust. The width of the doors varies from one place to another and ranges between 1.10 - 1.20 m. There is no type of flooring preferred to others.

**Permanent fixtures** such as wall cabinets, wall shelves, mirrors and shelves are 25 cm deep on the wall next to or in front of the bed and are 1.35 meters high. Some of the divider curtains and fittings in dormitories or multi-bedroom bedrooms are for the separation between two beds or to surround each bed from all sides.

**Lighting:** The study of single or double bed rooms and most of the rooms with four beds revealed that they do not rely on the existence of lighting fixtures in ceiling. In most rooms the light is on the wall behind the head of the bed at a height of 1.60 m to 1.95 m.



In most patients' bedrooms there is a low-wall night lighting or wall mounted lights for the whole room, but it is preferable that the night lights buttons are from the outer corridor or next to the door of the room. The single-bed rooms can be fitted with a suspended lighting unit above a chair next to the door inside the room because it is important to have an overnight nurse to monitor the patient and prevent visitors, while she at the same time can read for the rest of the day or the night without disturbing the patient.

Other electric devices: Recently, audio and video devices have been deployed to call nurses. These devices are preferred by hospital officials. Sometimes the nurse call device is installed above the bed. Sometimes the microphone is placed with the ceiling light to make it easier for the patient to see it. In the double-bed rooms, you can choose whether to put one device for two beds or one for each. In a few number of hospitals, a nurse call device is placed above the patient's head that includes several radio channels, and in fewer cases a television is placed.

**Oxygen Absorption Equipment:** Oxygen is pumped into special pipes from a central source in most patients rooms. Oxygen pipe exits are from 1.2 m to 1.65 m above ground.

**Natural lighting:** The patient's room must be provided with natural light. The windows of the patients' rooms must have good acoustic and thermal insulation, be easy to move, and provide good ventilation without air currents. There should also be solar screens outside the inner window

from the sunny side. Window openings should not be less than 20% of the ceiling area with a minimum of 2 m.

**Bathrooms:** Bathrooms can serve one or two rooms, with a bathtub, a toilet and a basin. They should be easily accessible and have the minimum measurements of 0.85 × 1.30 m

## DISCUSSION:

### A. Evaluation of Dialysis Department in a governmental hospital:

- dialysis unit or department must be close to the emergency department and on the first floor according to standards. This is achieved in the hospital of this study where the dialysis unit is close to the emergency department and on the first floor.

- the number of beds in each unit should be at least five. In the hospital of this study the number was five before expanding which makes the design standards wrong and inappropriate.

- According to the standards adopted in this area each registered supervising nurse has BCLs certificate with five-year experience at least or a midwife with experience of at least ten years. Subsidiary midwives have experience of not less than ten years, or a nursing degree with three-year experience and able to manage three beds (dialysis patients) and at the same time with more effort 6 beds where patients are at risk. In emergency cases, one nurse should manage a single bed but because of the maximum capacity policy in the hospital of the study, the nine beds are run by four nurses. Often they are

responsible for checking the patient's weight and measuring blood pressure before and after each dialysis session. Inserting the needle and visual evaluation follow-up of patients, monitoring devices and machines indicators during the dialysis and checking the patient's weight and documentation after the dialysis are run by one nurse for every two beds or three. Nurses and experienced cleaners are responsible for connecting devices and sterilization in the department. Most of the time they are distributed as a nurse for six beds and a nurse for three beds and a nurse to monitor.

-The standards for operating the approved devices stipulate that the devices need to be shut off two days a week after 4:16 pm to 6:00 am the next day; the days are determined according to the operating policy, the number of patients and their distribution schedules in the department, but because of the policy of maximum capacity the machines are not shut off except in a few cases where one of the patients does not show up for the session.

- the area allocated for movement according to the standards adopted in the patients' rooms is (8 × 9 m<sup>2</sup>). In the hospital of this study there are two rooms opposite the nurses counter. In each room there is a bed and in the third room to the right of the counter is the expansion where the rest of the beds are with additional space for movement.

-The lighting in the hospital is appropriate according to the approved standards.

- There are alarms that work according to the device and emergency call device to call the doctors and the health team outside the department according to the standards adopted, too.

- The beds in the hospital are worn out, old, rusty and do not meet the approved standards. There are no washing chairs either.

- The floor is wiped every one to two hours and at least three times a day. This does not go in accordance with the approved standards which say at least two, not three times, which makes it possible for a moist environment to form suitable for the growth of germs unless the floor is dried in the most appropriate way, but the floor in the hospital is difficult to dry because of a specific defect in the underground water pumping networks which causes the leaking of water out of the devices to the ground.

- The nurses counter after the expansion is not suitable for observation and does not meet the standards adopted, which necessitated the placement of a plastic chair in the rooms away from the counter so that the nurse or a cleaner alternately sit to observe the course of treatment.

-The decoration is not appropriate in the department and there are a lot of slogans and informal papers. Policies and tables of notes are hung on the walls and windows of the opposite rooms.

- The building design is old in general and most of it is not in accordance with the design standards and specifications

adopted here. The area of support rooms and warehouses is off specification.

-There is very little arrangement of the office papers on which work is done. The places of medicines, their cabinets and warehouses containing the tools and other support places are off specification.

-The place of trash cans is inappropriate.

- washing basins do not meet the approved specifications. There are three basins one of them with a broken faucet that leaks continuously.

- There are a number of chairs that do not conform to the approved standards and furniture armchairs have become old and torn.

- There are some rusty components of the dialysis device such as the iron chains attached to the device. Most of the devices are not clean from the outside which violates the specifications and standards adopted.

- The door of the expansion room is kept open by placing a box of sodium bicarbonate in front of it and this is contrary to the approved rules, specifications and standards.

- Wooden doors and closets are mostly without locks and external locks are not suitable. This goes against the approved standards and specifications.

- the ceiling and the walls are dirty and not cleaned. This goes against the specifications and standards adopted.

-The container of dirty sheets is placed in the middle of the two opposite beds in the expansion room. There is no suitable place for them. There are also some devices and equipment adjacent to these two beds, not in warehouses and other support rooms.

- The number of non-fixed chairs is large and does not conform to the approved standards and specifications.

- the specifications of dialysis device according to the approved standards are a modern device with a controller and a touch screen displaying the values of all vital indicators including blood pressure in addition to an alarm bell.

- There are two beds opposite of which there are no windows, which is contrary to the approved specifications and standards.

- There are many cabinets in the single-bed rooms and the desk of the head of the unit is made of wood and worn out.

- There is only one bathroom in the department used by the cleaner only. There are no bathrooms for patients or staff (a bathroom outside the department).

- There is a clear policy to prevent the entry of visitors and companions to the treatment room outside specific hours, but they are not complied with and usually every patient comes with one or no companions.

- There are broken power plugs and broken wall tiles, which goes against the approved specifications and standards.

- There are no wheelchairs or services for the disabled and people with special needs in the hospital.
- Some of the beds have two devices attached. one of them works for a patient and then enters sterilization mode. The other patient is directly connected to the other device and here we have a serious risk in case of forgetting the sterilization of the device and re-connecting it to the second patient, especially during alternating shifts. This is contrary to the specifications and standards adopted.
- The design specifications of the main entrance of the division do not conform to the approved standards.
- The Office of the head of the division is off specification
- Doors and the entrance door specially have writings by irremovable black ink. It is also unpainted. Most of the walls and doors are painted with old white paint and there are areas where the paint is scratched.

#### **B. Evaluation of a Private Hospital:**

A field visit was conducted to one of the licensed hospitals in the governorate (30-

bed private hospital) in order to evaluate the design of the hospital and its conformity to the specifications in this field. A verification questionnaire was prepared based on the ministerial specifications and specifications approved in this field (**Table 1**) and The results of the visit were summarized in the table 2 (**Table 2**).

#### **CONCLUSION:**

The Syrian Ministry of Health issued standards and engineering specifications for the design of hospitals, but they do not follow the standard code model since the presence of such a model facilitates the design and the planning process and increases the quality of the health facilities to be implemented. In this research, all specifications issued by the Ministry of Health for the general engineering specifications related to the construction of hospitals and engineering specifications for the functional services were reviewed. A comparison was drawn with the international standards adopted in this field. Also, a verification form was applied empirically in a private hospital and the dialysis department was evaluated in a governmental hospital.

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**TABLES:**

**Table (1):**The form for Assessment of Private Hospital Design:

<b>Item evaluated</b>	<b>Degree of compliance with specifications</b>
Natural ventilation and lighting of the patient’s room	
There is a bathroom for every patient’s room	
There is at least one isolation room entered through special doors	
There is a records office. Its presence secures the confidentiality of medical records.	
The Presence of means of protection and hand washing in nursing units	
The presence of a special place for cleaning tools on each floor in a suspended place containing cleaning tools and materials	
There are as many toilets as there are labor rooms	
There are paths for wheelchairs in the Physical Therapy Department	
Ventilation within the catering services section provides adequate pressure to prevent dust and germs from entering.	
For cleaning services, a place for final collection and delivery of all types of waste is available at the entrance of the service vehicle	
the pharmacy provides for more than 50 beds	
The presence of a separate isolated space in the laboratory with the health and technical annex for the tests of microorganism according to the criteria of safety crises	
The laboratory includes a waiting lounge, toilets, a sampling room, storage areas and refrigerators, washing tools, and destruction	
Provides a main entrance for both patients and clients	
Provides special entrance for services accessible by cars	
The size of the patient's room windows is eighth of the room’s space	
The main entrance provides for the movement of people with disabilities (built-in ramps)	
One-floor hospital. It does not need stairs	
The width of the stairs is at least 125 cm	
Special corridors for people with disabilities and patients (ramps ....)	
Number of elevators for patients and visitors 25-bed hospital 1 elevator for patients 26-50-bed hospital 2 elevators for patients 51-100-bed hospital 3 elevators for patients and one elevator for visitors 101-200-bed hospital two elevators for patients and two elevators for visitors Extra elevator for every 50 beds above the 200	
Width of Patients’ Corridors > 180	
There are no visible fixtures in the corridors	
Free width of the corridors leading to operating rooms is 200 cm	
The net height of the ceiling is not less than 204 cm	
Assumed Specifications of bathrooms and toilets for patients	
None of its dimensions is less than 1.25 m	
The door of the patient's toilet does not open inward	
bathrooms for disabled people are provided one per 20 beds of at least 4 m <sup>2</sup>	
There is an intensive care bed for every 10 beds	
Notes	

**Table (2) :** The Results of Assessment of Private Hospital Design:

Studied Item	The degree of compliance with the verification form	
	Verified	Unverified
Entrances	The presence of a main entrance for patients and clients separated from emergency entrance	The main entrance does not support the movement of people with disabilities. There are no ramps except in the emergency entrance. There is no services entrance
Interior specifications	Stairs width is 150cm There are two elevators(one for people and patients + the other is for stretchers) Corridors width > 180 There are no apparent fixtures in the corridors	There are no special corridors for people with disabilities and patients
Bathrooms	There is one bathroom in every patient's room	There is on bathroom in the ground floor for both genders. They are supposed to be two (one for every gender) There are no special bathrooms for people with disabilities. Bathrooms door open inwards. They should open outwards.
Clinical Department	Natural lighting and ventilation for each room There are means of protection and hands washing There is an intensive care room with 3 beds	
Operating Department	There are 3 operating rooms in addition to an IVF room and ophthalmological operating room. There is a resuscitation room inside the operating room.	The separation between sterilized and unsterilized area is done through a red line. There should be separating doors instead. There is one dressing room in the operating room for both genders. The path of waste disposal passes through the elevator of patients and visitors. There should be a special route for waste.
Department of Labor, Delivery and Incubators	There is a gynecological clinic in the department There is a nursing repose place Incubators department is in the operating department	
Department of Radiology		There is a distance between the department of radiology and the emergency department where the former is in the first floor, the latter is in the ground floor.
Laboratory		There is no separated and isolated place with health and ophthalmological test for microorganisms. Instead, there are two laboratory rooms with their devices, where there are also samples and medical waste.
Emergency Department	There is a special emergency entrance separated from the main entrance. There are ramps and corridors for people with disabilities. Emergency rooms are fully equipped	There is no administrative supervision of the emergency department as in the design