

Sector: Healthcare

Operation Theatre

Student Workbook

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Session 1: Zones and Areas in Operation Theatre Complex

In this session, you will learn about the aims of planning of operation theatre and the zones and areas in Operation Theatre complex.

Relevant Knowledge

An operating theatre, operating room or surgery suite is a room within a hospital, within which surgical operations are carried out in a sterile environment. The Operation Theatre complexes are designed and built to carry out investigative, diagnostic, therapeutic and palliative procedures. These set ups are customized to the requirements based on size of hospital and patient turnover and may also be designed to suit the specialty needs.



The need for safety, convenience and economy guide the planning of a modern operation theatre complex, whatever the size, number or the specialty. Efforts are directed to maintain vital functions, prevent infections/ promote healing with safety, comfort and economy.

Aims of Planning

- (i) To promote high degree of asepsis.
- (ii) Ensure maximum safety to patients and staff working in OT.
- (iii) Ensure maximum utilization of the OT.
- (v) Ensure maximum comfort to the surgical team, considering long hours of work in difficult posture.
- (v) To provide complete environmental control.
- (vi) Flexibility of uses of operating suites.

Location

The best location for the OT is the one which permits a convenient and uncomplicated flow of patients and staff. It should be close to surgical wards and ICU. OT receives patients from the floor through non-public corridor, elevators and ramps. Convenient access to elevators is, therefore, essential.

Size

The size of OT will depend upon the surgical facilities:

- (i) General Operating Room – 40 sq. meters.

- (ii) CVTS, Neurology, Orthopedics – 60 Sq. meter additional adjoining room is required for Heart lung machine.
- (iii) Endoscopy suite will require procedure room of 20 sq. meter.
- (iv) For OT of 200 – 300 bed district hospital the optimum size is 18" x 18" to 18" x 20" but not more than 400 sq. feet.

Zones in OT Complex

The location and flow of patients, staff and various equipments decides the OT complex to be divided into different zones. These zoning are based on the need of variable level of cleanliness and sterility. Conventionally, the OT complex has been divided into four zones:

1. Protective Zone
2. Clean Zone
3. Aseptic Zone
4. Disposal Zone

1. Protective Zone: It is the outermost entry/exit zone of the OT complex. It includes:

- (a) Changing rooms for OT staff (doctors, nursing staff and other support staff).
- (b) Patient's waiting area and reception
- (c) Rooms for administrative Staff
- (d) Stores and records room.
- (e) Receiving area for various materials and equipments

2. Clean zone: It connects protective zone to aseptic zone. It includes:

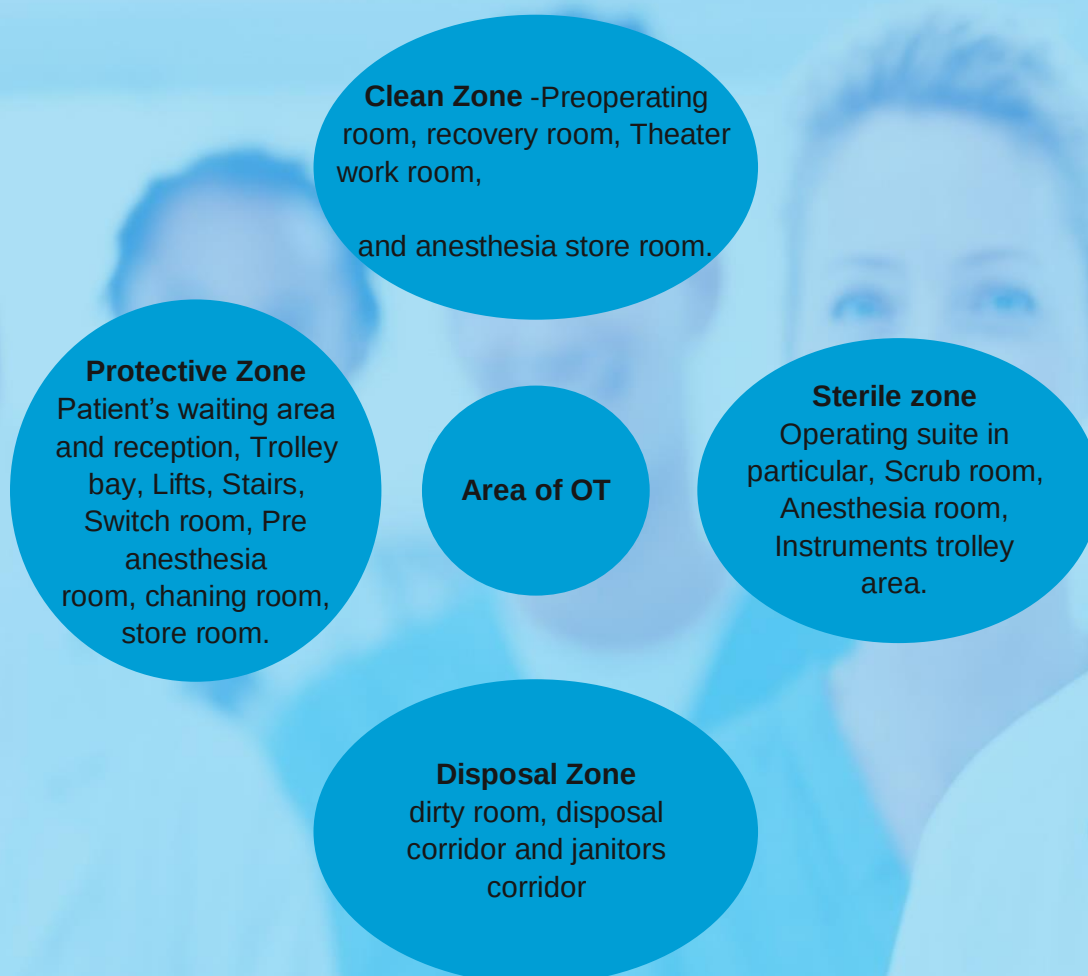
- (a) Pre-operating room
- (b) Recovery room
- (c) Store room for sterile equipment and consumables.

3. Sterile/Aseptic zone: It includes operation rooms which are kept sterile. This zone include:
- (a) Operating room/suite in particular
 - (b) Scrubbing station/ room and gowning area/ room.
 - (c) Pre-Anesthesia room
 - (d) Sterile Instruments trolley area.
4. Disposal Zone: Areas in this zone include dirty utility and disposal corridor. Disposal areas from operating room and connecting corridors leads to Disposal zone. The connecting corridors are outside the aseptic zone.

Sub Areas (excluding OT place) for various OT related activities:

- (1) Pre-operative check in area (reception)- It is used to maintain privacy, for changing clothes and wearing gown and to provide lockers and lavatories for staff.
- (2) Holding area for patient- This area is planned for IV line insertion, preparation, catheter / gastric tube insertion, connection of monitors, etc.
- (3) Anaesthesia Induction room - It provides space for anaesthetic trolleys and equipment and per performing anaesthesia related interventions
- (4) Post anaesthetic care units (PACU) – It contains a medication station, hand washing station, nurse station, storages pace for stretchers, supplies and monitors/ equipment and gas, suction outlets and ventilator.
- (5) Staff room – Men and women change dress from street cloth to OT attire.
- (6) Sanitary facility for staff- One wash basin and one western closet is usually provided.
- (7) The anaesthesia gas / cylinder manifold room / storage area - It should be in a cool, clean room that is constructed of fire resistant materials.
- (8) Laboratory – Small laboratory with refrigerator for pathologist is provided.
- (9) Theatre sterile supply unit (TSSU)- In this area temperature between 18 to 22°C, humidity of 40 to 50% is maintained. Sterile drapes, sponges, gloves, gowns and other items ready to use are stored in this unit.
Proper inventory of the items required are maintained in this unit.

Adequate water supply, electricity back up and cleanliness is maintained in the OT complex



Assessment

A. Short Answer Questions

1. Briefly explain the purpose of operation theatre
2. List the different zones of Operation theatre

Part A

Differentiated between the following:

1. Protective and sterile zone of OT
2. Clean and disposal zone of OT
3. Pre-operating room and recovery room

Part B

Discussed in class the following:

1. Ideal location of OT
2. Purpose of OT
3. Zones of operation theatre

Session 2: Staffing and Equipment of Operation Theatre

In this session, you will learn about range of equipment of OT. You will also study about the staff associated with operation theatre.

Relevant Knowledge

Operation theatres are mainly utilized by the surgical departments for conducting various surgeries with the help of the anaesthesia department. The optimal management of various surgeries requires team approach including various departments and support units. There should be perfect planning of the OT scheduling, timely preparation, complete PAC, preoperative treatment and shifting of patient to theater. With the advancement in technology and improvement of the surgical skills, more complex surgeries are being done and include, simultaneously, various medical and paramedical personnel:

The OT Staffing includes:

1. Doctors: Surgeons (from various surgical specialities like general surgery, ENT Surgery, Orthopedics Surgery etc), Anaesthesiologists and other ancillary medical staff like radiologists, pathologists etc.
2. Nursing staff
3. OT Technicians
4. Other support staff: like Store keeper, Record keeper, Nursing assistants, General Duty Assistants (GDA), sanitation staff etc.

Equipment in Operation Theatre Complex

The modern Operation Theatre complex is highly equipped. The range of equipment of OT will depend upon the OT of a particular specialty. The requirement of equipment in OT complex includes medical equipment and medical furniture. All the OT complex area must be equipped with medical gases delivery system. (Oxygen, Nitrous Oxide, medical air along with a dedicated suction line)

Medical Equipment: The requirement of medical equipment varies with the type of surgeries routinely being done in a particular operating room. The common medical equipment includes:

1. OT table(s) and OT lights
2. Anesthesia machine(s)/ Workstations
3. Patient monitors (ECG, BP, Oxygen saturation, etc.) and Defibrillator(s)

- 4. Drugs and Drug Trolleys.
- 5. Various surgical equipments required for performing surgeries.

Medical Furniture: This is specified furniture for use of patients in the operation theatres and other hospital areas. These are usually different from household furniture specifically with regards to their fixity, mobility, cleanliness, lightweight, adjustability, with safety features. E.g. Hospital beds, hospital couches, patient transfer trolleys, storage cabinets for medicines and equipments.

Office furniture: In addition to the above, office furniture like chairs, tables, filing cabinets, almirahs, lockers etc. are required in the rooms in protective zone for record keeping, administrative work etc.

Training of Staff

All staff member should be trained in the maintenance of asepsis and universal precautions. All the medical staff, nursing staff, technical and non technical staff have different responsibilities and they all work in close harmony.

Training of staff is done on “technical skills” and ”non-technical skills”. The former includes the psychomotor dexterity, coordination and decision making that are required to carry out complex psychomotor tasks (e.g. to successfully do a surgical or anaesthesia procedure). This require dedicated training programme like B.Sc. (Nursing)/ MBBS/ MS/ MD in their respective fields. In case of latter, a healthcare provider is trained to work effectively as a member of a team and should possess skills like communication skill, leadership skills, interpersonal skills, coping with stress, etc.

Patient safety is of utmost importance. Open communication and effective interdisciplinary teamwork helps in successfully achieving the target of providing safety to the patients. Teamwork can be defined as a set of interrelated behaviours, actions, cognitions and attitudes that facilitate the required task work that must be completed. Team-members must possess specific knowledge, skills and attitudes to achieve the goals.

Exercise

- 1. Visit a nearby hospital and prepare the list of staff working in the OT.

Staff	Roles and Functions

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Exercise

A. Short Answer Questions

- 1. List any five professional and staff generally present in OT
- 2. What kind of training is required for OT staff?

Checklist for Assessment Activity

Use the following checklist to see if you have met all the requirements for assessment activity:

Part A

Differentiated between the following:

- 1. Medical furniture and office furniture
- 2. Sterile Zone and Clean Zone

Part B

Discussed in class the following:

- 1. Training of staff of OT
- 2. Equipment in OT

Session 3: Preparation of Patient for Operation

In this session, you will learn about the role of GDA in preoperative preparation of the patient.

Relevant Knowledge

The General Duty Assistant or the Patient Care Assistant assist the team in OT. The various activities or tasks in which the GDA/PCA is involved is listed below:

(I) Pre-operative Preparations

- 1. The drugs that the patient is receiving are noted.
- 2. Patient's general condition is noted.



3. Adequate diet is given and its proper digestion is confirmed.
4. Adequate proteins and vitamin C are given in the diet.
5. Adequate liquids and water are given to the patient. If the patient is not to take anything orally, intravenous fluids are given to maintain fluid and electrolyte balance.
6. The patient is prepared mentally for various investigations he/she has to undergo.
7. Preoperative investigations are done, so as to ensure fitness for anesthesia and surgery.
8. If the patient's hemoglobin is low, it is build up by administration of appropriate therapy including blood transfusions.
9. Any medical disorders present are treated appropriately, so that they are under control at the time of the surgery.
10. A written informed consent is obtained from the patient and his relatives for the operation to be performed.
11. A sedative is administered on the night before surgery to reduce anxiety and ensure adequate rest.
12. A simple enema is given on the morning of the operation so as to empty the rectum and lower colon. A purgative is avoided because it may cause strong purgation, which may cause dehydration and electrolyte imbalance.
13. The stomach is decompressed using a nasogastric tube in case of an intestinal obstruction.
14. Vital parameters are checked and recorded twice a day.

(II) Local Preparation for Surgery

1. The hairs on part to be operated on are shaved, except the face in case of women and children.
 - (a) Hair is removed from skin folds.
 - (b) Cutting the skin is avoided, because bacterial infection may develop at the site of the cuts.

2. The shaved part is cleaned carefully with cetavlon. It removes dirt and oiliness from the skin.
3. The patient is asked to take a bath
4. The patient is given clean clothes to wear.

(III) Preparation before sending the Patient to Operating Theatre

1. The patient is given long gown to wear, which opens on the back.
2. The patient is given long socks to wear so that he/she does not feel embarrassed.
3. Lipstick and nailpolish are removed. This is important because the anesthetist has to note pallor and syanosis, which will not be seen in the presence of the colour.
4. The head is covered with a triangular bandage or a cap so that all hairs are covered.
5. Dentures are removed.
6. Spectacles or contact lenses are removed.
7. All ornaments including wrist watch, bangles, etc. are removed.
8. A label is tied around the wrist of the patient, giving the following information.
 - a. Name
 - b. Indoor number
 - c. Doctor"s name
 - d. Ward
 - e. Diagnosis
 - f. Operation to be done
9. The patient is asked to pass urine. This avoids the risk of development of urinary tract infection during catheterization.
10. The drugs prescribed to be given pre-operatively are given. Appropriate records are maintained of the drug administration.

11. The patient is taken to the operation theater on a trolley, along with his case papers and reports of his investigations.

Exercise

1. Visit a nearby hospital and observe how patient is prepared for OT. Fill the table given below:

Name of Surgery	Preoperative Care given

Assessment

A. Short Answer Questions

1. Describe the general duties of GDA in pre-operative preparation of the patient
- _____
- _____
- _____
2. What information is written on patient"s wrist band?
- _____
- _____
- _____
3. Enlist the major parameters assessed through physical examination in preoperative care of patient

Part A

Differentiated between the following:

1. Medical asepsis and surgical asepsis
2. Preoperative and post operative care

Part B

Discussed in class the following:

1. Role of GDA in providing pre-surgery care
2. Preparation of a patient for surgery
3. Importance of triangular bandage

Session 4: Post-operative Care

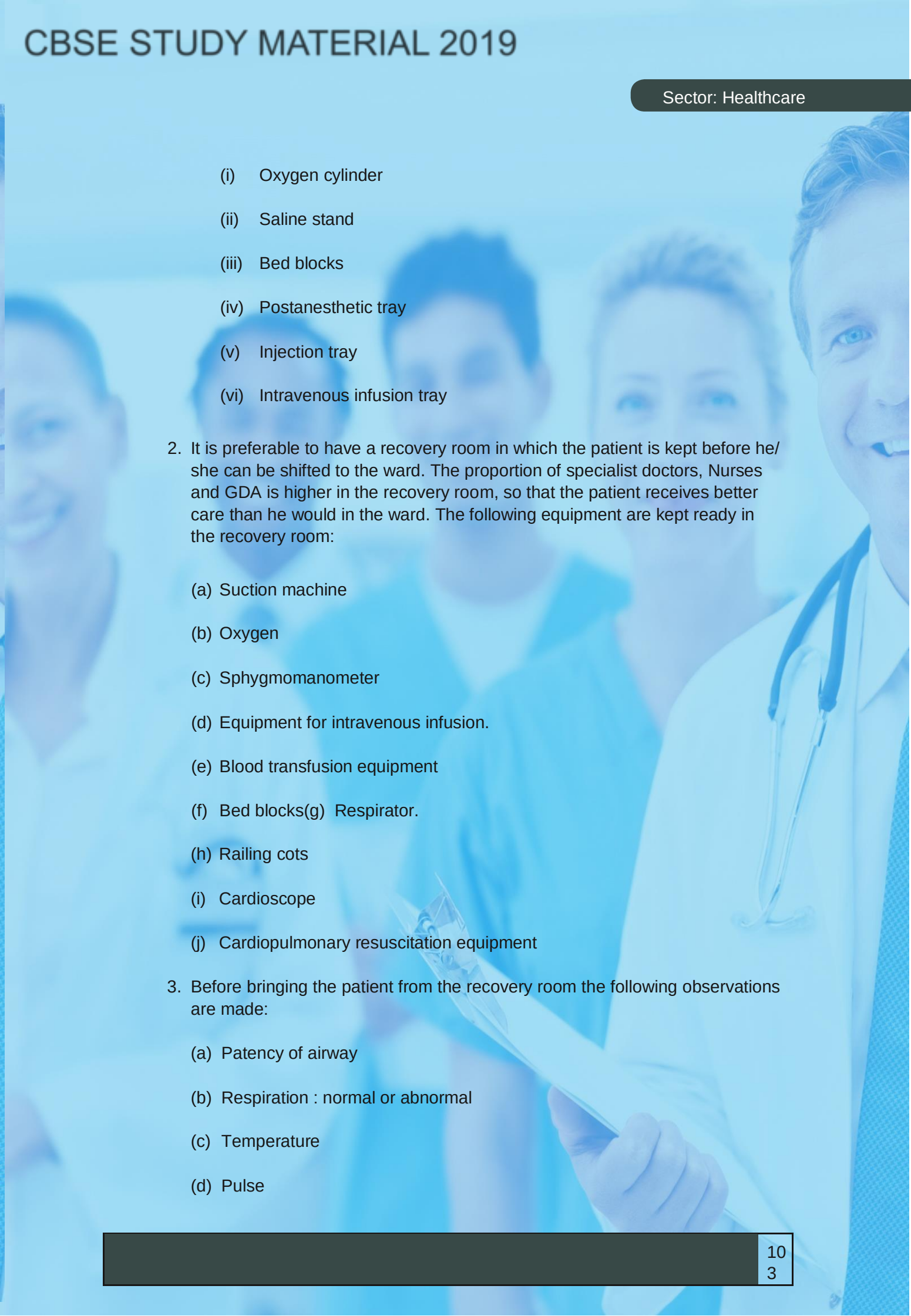
In this session, you will learn about the care rendered by General Duty Assistant in the post operative phase.

Relevant Knowledge

The GDA is responsible for the following tasks or activities in the post operative phase:

1. The patient's bed is prepared before he comes back from the operation theater. Other preparations include the following:
 - (a) The bed is made warm with the use of hot water bottles and bags.
 - (b) Extra blankets are used to keep the bed warm.
 - (c) The following articles are kept ready near the bed.



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- (i) Oxygen cylinder
 - (ii) Saline stand
 - (iii) Bed blocks
 - (iv) Postanesthetic tray
 - (v) Injection tray
 - (vi) Intravenous infusion tray
2. It is preferable to have a recovery room in which the patient is kept before he/she can be shifted to the ward. The proportion of specialist doctors, Nurses and GDA is higher in the recovery room, so that the patient receives better care than he would in the ward. The following equipment are kept ready in the recovery room:
- (a) Suction machine
 - (b) Oxygen
 - (c) Sphygmomanometer
 - (d) Equipment for intravenous infusion.
 - (e) Blood transfusion equipment
 - (f) Bed blocks(g) Respirator.
 - (h) Railing cots
 - (i) Cardioscope
 - (j) Cardiopulmonary resuscitation equipment
3. Before bringing the patient from the recovery room the following observations are made:
- (a) Patency of airway
 - (b) Respiration : normal or abnormal
 - (c) Temperature
 - (d) Pulse

- (e) Blood pressure
 - (f) Syanosis
 - (g) Recovery from anesthesia
 - (h) Nature of the operative wound.
 - (i) Drainage sites and tubes
 - (j) Patency of the intravenous line
 - (k) Presence of catheters and tubes
 - (i) Urinary catheter
 - (ii) Nasogastric tube
 - (l) Completeness of indoor papers and postoperative orders.
 - (m) Special instruction, if any
4. When the patient is brought to the ward, the hot water bottles and bags are removed and he is placed on the bed. The tubes and catheters are connected appropriately. The intravenous infusion bag or bottle is hanged from the saline stand.
 5. The patient is given semiprone position, which maintains his airway by preventing the following
 - (a) Tongue falling back.
 - (b) Aspiration of secretions
 - (c) Aspiration or regurgitated stomach contents.
 6. Moist oxygen is given by face mask or nasal catheter if the patient has undergone major surgery and the expansion power of his lungs is reduced so that he is hypoxic.
 7. The patient's temperature, pulse, and respiration are noted as soon as the patient is brought to the ward, because these parameters can change while the patient is being shifted out of the ward. If there is any change, it should reach the normal level in a short period. If it does not, something could be seriously wrong with the patient. These parameters are examined every half hour to see if pulse change. In case the patient bleeds internally or

externally, the pulse becomes rapid, and after severe bleeding, the respiration becomes rapid due to hypoxia.

8. The patient is kept warm. However overheating is to be avoided. Since it can lead to perspiration, dehydration, and electrolyte imbalance. It can also cause vasodilatation and increase the risk of hemorrhage from the operated area.
9. Fluids like normal saline and Ringer's lactate are given intravenously to make up for the loss during surgery and restore the fluid and electrolyte balance. Five per cent dextrose is given to supply calories. Over infusion of fluids is to be avoided because that can lead to pulmonary edema.
- 10 If intravenous fluids are to be infused over prolonged periods. Serum electrolyte levels are checked periodically so as to maintain electrolyte balance.
- 11 The patient is allowed to sleep in a comfortable position when he is fully conscious. He is permitted to move in bed and from the second day get out of the bed, unless he has a serious problem. Early mobilization reduces the risk of the following complications.
 - (a) Deep vein thrombosis.
 - (b) Pulmonary embolism
 - (c) Hypostatic pneumonia.
- 12 Fowler's position is given when the patient has undergone major surgery. It achieves the following:
 - (a) It permits deep breathing.
 - (b) It relieves flatulence.
 - (c) It permits gravity drainage of discharge
- 13`Some patients vomit during and after recovery from anesthesia. They are given sip of water and deep breathing exercises. If that does not relieve vomiting antiemetic drugs are used.
- 14 Flatulence is seen often after abdominal surgery. Flatulence causes severe abdominal pain. The patient becomes uncomfortable. Its incidence is reduced with early ambulation. Such patients are given antiflatulent drugs or a flatus tube is passed per rectum to remove the gas in the colon and rectum.

15 Pain is experienced during the first 1 to 2 days after the surgery. It does not permit the patient to sleep well at night.

16. Diet

- (a) After the patient has fully recovered from anesthesia and is found not to be vomiting and when his/her peristaltic sounds are normal, he/she is initially given water to drink. When he/she is found to tolerate that well, he is given liquids orally e.g. tea, coffee, coconut water, fruit juices, etc.
- (b) The next day he/she is given soft diet.
- (c) The following day he is given normal diet. Adequate quantities of vitamin C are ensured in the diet so that the operative wound heals well.

17 By the third day morning the patient will have received adequate diet orally and will pass stools. If he does not, he is given a simple enema. If the surgery has been done on the gastrointestinal tract, an enema only when asked for by the doctor treating the patient.

18 There is a risk of retention of urine postoperatively. It may be due to any of the following reasons, as shown in the following table.

Cause	Measure for correction
Pain	Analgesic drugs
Lying down position	Make the patient sit up with support for passing urine.
Lack of privacy	Put screens around the patient's bed.
Spasm of bladder neck	Application of hot water bag to the lower abdomen. Sound of running water.
Atony of bladder	Carbachol 1 ml IM.

19 If all measures fail at relieving the retention of urine, the bladder is catheterized. Repeated episodes of retention of urine are managed by the use of a self retaining urinary catheter.

20 Deep breathing exercises are given to patients who have undergone abdominal surgery.

- 21 If the patient is unable to breathe on his own, he may require endotracheal intubation or tracheostomy and ventilation using a mechanical ventilator.
- 22 The dressing on the wound is not changed unnecessarily so as to reduce the risk of wound infection. It is changed if it gets soaked by blood or discharge. In case of wound infection, the dressing is changed as frequently as required.
- 23 The sutures are removed after 7 days. If the wound has healed well. It is left open.

Exercise

- 1. Visit a nearby hospital and observe the post surgery care given to patient. Fill the table given below accordingly:

Name of surgery	Post operative care given

Assessment

A. Short Answer Questions:

- 1. What is the importance of the fowler"s position in post operative care?

- 2. Explain the methods of caring the patient required for surgical incision

- 3. Explain different measures for corrections and their causes in case of risk of retention of urine post operative

Checklist for Assessment Activity

Use the following checklist to see if you have met all the requirements for assessment activity:

Part A

Differentiated between the following:

- 1. Observation to be done prior recovery room and in the recovery room.
- 2. Post operative care and pre operative care
- 3. Recovery room and general room in hospital

Part B

Discussed in the class following:

- 1. The role of GDA in providing post operative care