



BED UTILISATION PATTERN OF INTENSIVE CARE UNIT OF A TERTIARY CARE HOSPITAL IN KOLKATA

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ABSTRACT

Introduction: Intensive or Critical Care is a method of organizing Medicine and Nursing, so that expertise and sophisticated equipments are concentrated where they are most needed and efficiently utilized.

Types of ICU: Service
Organ Age
Syndrome
Care wise: Open Unit Closed Unit
Semi Closed or Transitional Unit

AIM:

To study the bed utilization pattern of ICU To study the bed utilization indices of the unit during the study period.

METHODOLOGY:

Retrospective Study: To study the various Records, Registers, and Policy File of the Department of ICU, Bed Utilization pattern during November 2015 to April 2016, Morbidity pattern during November 2015 to April 2016.

Prospective Study: To study Location Physical Facilities, Staffing Pattern, Equipment of ICU, Policy & Procedure. Bed Utilization Statistics from May 2016 to June 2016.

Results: From the above indices, the following averages were deducted for the Study Period:

Average Daily Census: 17.29
Average Bed Occupancy Rate (BOR): 75.53%
Average Length of Stay (ALS): 5.53
Average Bed Turnover Rate (BTR): 4.29/month, i.e. 52/year.
Average Bed Turnover Interval (BTI): 1.5
Average Admission/day: 17.28
Average Daily Census: 17.29

Conclusion: The Statistics thus deducted in the Study shows how deftly this Institute is serving the Patients admitted from Kolkata and outside. With a vision to be one of the leading Hospitals of India, the Hospital is striving sincerely to reach the Goal.

KEYWORDS : BOR, ALS, BTR, BTI, ICU

INTRODUCTION:

Intensive or Critical Care is a method of organizing Medicine and Nursing, so that expertise and sophisticated equipments are concentrated where they are most needed and efficiently utilized.

Over the last few years, there has been a tremendous increase in the knowledge, technology and skills required to treat critically ill patients. This has led to the development of ICU which is essentially areas where severely ill patients can be concentrated and looked after and provided with the infrastructure and expertise necessary to treat critical illness.

WHAT SYSTEM OF ICU CARE IS BEST?

Types of ICU: Service
Organ
Age
Syndrome.
Care wise: Open Unit
Closed Unit.
Semi Closed or Transitional Unit.

There is much debate on who should admit and manage critically ill patients in the ICU.

CLOSED UNIT is one where once the patient enters the ICU, Primary care of the patient is transferred to the Consultant Intensivist. The

Consultant Intensivist takes all the Major decisions in the ICU, including admission to and discharge from the ICU. Once the patient is transferred from the ICU, care of the patient is transferred back to the primary Consultant.

OPEN UNIT is one which any Consultant may admit a patient to the ICU, with or without the knowledge or consent of the Consultant Intensivist. Often, such ICUs may not even have a Consultant Intensivist on their Staff. The Primary Consultant remains In charge, makes all decisions regarding patient care management

SEMI CLOSED OR TRANSITIONAL UNIT is one which lies in between. There is a mandatory consult and daily rounds by the Consultant Intensivist for all patients admitted to the ICU. Both the Primary Consultant and the Consultant Intensivist bear significant role in the patient care.

ICU in the hospital where study was conducted is of the Semi closed type.

COST FACTOR:
It is 2.5 to 20 times the normal bed charges.
In USA 5% ICU beds consume 15% budget.

BED UTILIZATION PATTERN OF ICU (23 Bedded) of the 4th Floor

AIM:

- To study the bed utilization pattern of ICU
- To study the physical facilities of the unit.
- To study the manpower available to the unit during the study period.
- To study the equipment available to the unit during the study period.
- To study the bed utilization indices of the unit during the study period.

MATERIALS AND METHODS:

Retrospective Study:
To study the various Records, Registers, and Policy File of the Department of ICU.

To study Bed Utilization pattern during November 2015 to April 2016.

To study Morbidity pattern during November 2015 to April 2016.

Prospective Study:

- To study Location, Sitting, Layout, Design & other Physical Facilities.
- To study the Staffing Pattern.
- To Study the Equipment of ICU.
- Policy & Procedure.
- Bed Utilization Statistics from May 2016 to June 2016.

RETROSPECTIVE STUDY:

To compile the Bed Utilization Statistics, the following methods have been applied:

In the retrospective study, in the period from 1st November 2015 to June 2016 the following data were collected from the census maintained by the Hospital Computer Department.

The number of patients brought forward from the previous day at 0 hours of the day which daily census is prepared.

The number of cases transferred from the other ward due to deterioration of their condition.

The number of Discharges and Discharge against Risk Bond (D.O.R.B).

The number of patients who have recovered substantially, and are transferred to the wards.

The number of deaths.

The report is sent to the Nursing Superintendent from where a copy of the census is sent each to the emergency, records section, MS, MD & CEO. Another copy goes to the computer section, where they are recorded for ready reference.

TO STUDY THE PHYSICAL FACILITY OF ICU:

LOCATION:

The 23 Bedded ICU is located at the 4th Floor of the Main Building. This is easily

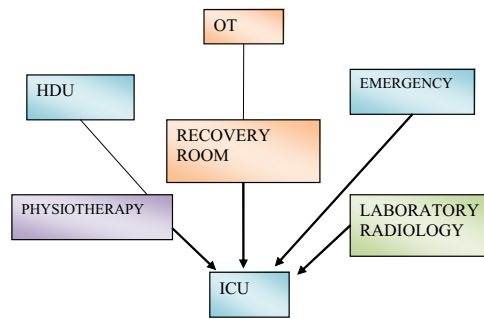
accessible by 4 Elevators. The Corridor leading to this Unit is away from the Traffic of the OPD

Complex. The approach area is large (Corridor is 5 meters wide). The Bed capacity of this Unit

is 23, which is 0.55% of the total number of Hospital Beds. The total Floor of this particular

ICU is 4500 sq. ft. The conceptional layout is shown in the attached diagram.

RELATIONSHIPS WITH OTHER DEPARTMENTS:



PRIMARY BED AREA:

Each Patient space has an area of 24 sq. ft. The minimum Head-Wall width is 1.2 ft. The distance between two adjacent Beds is 8 ft. and the distance of each Bed to the Bedside window is 5 ft.

Beds are free from all sides. The walls are washable and free from fissures. The ceiling is non porous and crack free. There is one Hand washing fixture for every 3 Beds. Medicated Liquid soaps and dry Paper towels are kept by the side of each one.

Two Canary Yellow outlets for Oxygen ; Two Black Outlets meant for vacuum extraction @ 40 Lit/min.; One white Outlet for the Compressed Air. There are also Eight Electrical Sockets.

There is One Monitor for each Patient. There is one Isolation Room of 124 sq. ft. area with One Bed in it.

NURSING STATION:

There are Two Nursing Stations on either side of the Main Entrance of this ICU, each of which

has a direct visualization of the 24 Beds. Things that are present at the Nursing Station are

Storage Area for Stationary Items, Two sets of Computers with Printers, Two telephones,

Multiple View Boxes, and the Central Monitor.

MEDICATIONS:

Medications are supplied from the In-House Pharmacy where Prescriptions are sent On-line from the Ward. Medicines are brought to the ICU by Delivery Men. The Pharmacy is open 24 hours.

PANTRY:

Pantry is placed outside the Entrance of the ICU Corridor. Food is supplied by the Kitchen Staff.

Food is served in Mobile Food Trolleys. Most Patients require Parenteral or Nasogastric feeding.

The Nursing Staff help the other ailing Patients with their food.

STORE:

There is an attached Store for the Linen and Stationary Items, and also for the I.V. Fluids,

medicines near the Entrance.

SANITARY AREA:

Janitors' Closet, Toilet, Bathroom, Sluice Room, are situated at the extreme end of this ICU. Most Patients are immobile and require Bedside help, but for the few mobile Patients, there is a Toilet.

AUXILIARY AREA:

On either side of the entrance, there is one Doctors' Room and one Nurses Inventory. Shoes are covered with sterile disposable Shoe Covers.

STAFFING

The ICU operates under direct supervision of the ICU in-Charge, who is an Anesthetist by qualification.

THE NURSING STAFF

The Shifts are:

8 AM to 2 PM : Morning

2 PM to 8 PM : Evening

8 PM to 8 AM: Night.

Number of Staff in each Shift: Seventeen

Senior Staff in each Shift: Six.

Students in each Shift: Five.

NURSES: PATIENT

Day time:

1:1 (if there is patient on Ventilator)

1:2 (otherwise)

Night time: same

Nursing Staff: ICU Bed = 1:1

THE ICU IN-CHARGE HAS THE FOLLOWING ADMINISTRATIVE CHARGES:

Spokesman for Unit in Administrative matters.

Provides continuity in clinical care.

Organizes Teaching and supervision of Junior Staff who require detailed instruction not only regarding patient care but also for use of unfamiliar equipments.

Is responsible for purchasing and servicing of ICU equipment.

Initiates Research and be recognized as Authority.

He is knowledgeable about all the patients and he reviews all treatment regimens with the Staff.

DOCTORS IN THE ICU:

4 during Day time.

2 during Night time.

1 ICU In-Charge.

Consultants are available for opinion round the clock.

OTHER STAFF ASSOCIATED:

Physiotherapist: Physical Therapist, Respiratory Therapist.

Radiographer: Available round the clock.

Biomedical Engineer: Present round the clock.

Blood Gas Analyzers.

Ward Secretaries: During Day Time.

Safaiwalas: Round the clock.

Ward Peon: Day time.

EQUIPMENTS:

Procedural Equipments:

* Pacing Related Equipments: 4 Nos.

* Airway Equipments.

Laryngoscope: 8 Nos. (7 Adult & 1 Paediatric)

Endo tracheal Tubes: (sufficient numbers, different size)

Mouth Gag: 8 Nos.

Tracheostomy Set with

Metallic Tube (2 Sets, one Adult, one Paediatric size)

Cuffed and noncuffed Portex Tube

Portex Mini Tracheostomy Kit (sufficient numbers)

AmbuBag: 5 Nos. (Adult) & 2 Nos. (Paediatric)

Bronchoscopy with Video Monitor: 1 No.

Endoscopy with Video Monitor: 1 No.

* Phlebotomy with Cut-Down Instruments: 1 Set.

* Central Medical Gas:

Two Canary Yellow Pipes- 02 Outlets.

Two Black Vacuum Outlet

(40 Litre/Min, 500mm Hg)

One White Compressed Air Outlet.

* Suction Outlet: One.

* Electrical Socket: Eight Turn-Type Socket.

* Neuro Surgery Skull Traction Device: 1 No.

* Radial Artery Catheterization related Equipments.

* Central Venous Cannula.

* Lumber Puncture Set: 4 Set.

* Equipments related to Pleural aspiration: 2 Nos.

* Equipments related to Peritoneal aspiration: 2 Nos.

* Equipments related to Chest Drain Insertion.

* Ophthalmoscope: 1 No.

* Otoloscope: 1 No.

* ANS & PNS Packing Set for management of Epistaxis: 2 Set

Monitors: One for each Bed Displaying:-

Oxygen Saturation.

Blood Pressure

Respiratory Rate

Electro Cardiogram.

One Central Monitor displaying.

Vital signs of a selected few Patients.

Ventilators: Siemens-Servo 900C: 11 Nos. (10 in working condition)

Servo I.: 1 No.

Defibrillators : 1 No.

Portable X-Ray : 1 No.

Fluoroscope : 1 No.

Portable Ultra Sonogram : 1 No.

Echo Cardiogram : 1 No.

Trans Oesophageal Echo Cardiogram (TEE): 1 No.

POLICY AND PROCEDURE

Admission Procedure:

Types of Patients admitted in the ICU:

Patients with multiple injuries or after major Operations who require continuous monitoring or support of vital functions. Patients requiring Ventilatory support.

Patients requiring Tracheostomy and supporting airway. Patients requiring support to maintain cardiovascular integrity, e.g. Shock. Patients with Metabolic Encephalopathy. Poisoning.

Policy once the Patient is admitted in the ICU:

The Patient is admitted in the ICU with the clinical responsibility of Consultant/Medical Unit under whom they are admitted. A Bed is booked in the Ward when the Patient recovers. Patients come either directly from the Casualty or are admitted directly by the Consultants.

The ICU in-Charge is responsible for maintaining continuity of care.

The ICU in-Charge/Senior Resident may initiate treatment in Emergency. Respective Consultants are informed about it.

DAY TO DAY CARE & DISCHARGE POLICY:

Daily ICU Rounds, once in the Morning and once in the Evening Hours. Main decision is taken during these Rounds.

Asepsis Procedure: All the Procedure of changing of shoes, using sterile Robe and hand washing are followed to control Nosocomial infections.

Cleaning of the Floor: Cleaning of the Floor by regular mopping with Disinfectants- thrice a day and when required in between. Periodic cleaning of the walls is done.

Fumigation: Fumigation of the Patient care area is carried out part by part.

Antibiotic Policy:

The Goal of Antibiotic Policy is to ensure effective, economical prescribing of Antibiotics to minimize the selection of resistant microorganisms.

IDENTIFICATION TAG:

Every Patient has individual Identification Tag with Registration Number.

BED UTILIZATION STATISTICS

Average Daily Census = Sum of Daily Census of the Month /No. of Calendar Days.

Bed Occupancy Rate= (Average Daily Census of the Unit/ Bed Complement of the Unit) X-100.

Average Length of Stay= Total No. of patients in the Period / No. of Discharge + Transfer to other Ward + D.O.R.B. + Death.

Bed Turnover Rate= No. of Discharge + Transfer to other Ward + D.O.R.B.+ Death/Bed Complement.

Bed Turnover Interval=(Maximum Patient Days in the Period – Actual Patient Days in the Period)/ (No. of Discharge + Transfer to other Wards + D.O.R.B. + death.

Morbidity Pattern of Diseases in the Period.

Bed occupancy rate (month wise):

Bed Occupancy Rate indicates the relationship between availability and utilization of Hospital Beds and facilities. It is expressed as percentage of

$$\frac{\text{Average daily census of the unit}}{\text{Bed compliment of the unit}} \times 100$$

Nov'15 = (17.7/23) x 100 = 76.95%

Dec'15 = 75.4%

Jan'16 = 87%

Feb'16 = 83.2%

Mar'16 = 75.7%

Apr'16 = 59.5%

May'16 = 65.3%

Jun'16 = 78.2%

Morbidity:

Disease	Month							
	Nov '15	Dec '15	Jan '16	Feb '16	Mar '16	Apr '16	May '16	June '16
CVA	33	18	20	14	16	11	24	22
SEPTICAEMIA	5	1	1	1	2	2	2	1
HEAD INJURY & POLYTRAUMA	33	22	20	16	10	15	15	18
CONVULSIVE DISORDER	5	4	3	1	4	1	6	7
GI BLEEDS	0	4	2	6	1	2	0	3
MI	4	4	5	2	2	5	4	6
LVF	3	1	3	1	2	1	2	2
BRONCHIAL ASTHMA	2	5	10	3	4	6	5	5
COPD	5	8	9	7	4	5	4	4
ESRD	3	1	1	6	3	2	1	5
PACREATITIS	4	3	3	4	3	4	2	5

POISONING	2	1	0	2	3	4	2	4
GASTRO SURGERY	5	4	2	3	4	5	6	6
NEUROSURGE RY	4	6	6	6	8	8	11	9
THORACIC SURGERY	1	1	1	3	2	1	3	2
ORTHO SURGERY	1	1	1	3	2	1	3	2
DENTAL SURGERY	1	1	1	2	2	1	1	1

Average Length of Stay of the ICU in the study Hospital from November 2015 to June 2016 is

5.53

Bed Turnover Rate:

Bed Turnover Rate means the Number of Discharges per Hospital Bed over a given period, i.e.

how many times a Bed was "Turned Over" during the period, i.e. Eight months.

Nov'15 = 87/22 = 3.95

Dec'15 = 103/22 = 4.68

Jan'16 = 96/22 = 4.36

Feb'16 = 93/22 = 4.22

March'16 = 97/22 = 4.40

April'16 = 99/22 = 4.50

May'16 = 92/22 = 4.18

June'16 = 90/22 = 4.09

Average Bed Turnover Rate is 4.29, i.e. one Bed is turned over 52 times in a year.

Bed Turnover Interval:

It denotes the average time in days elapsing between the Discharge of the Patient and the Admission of the next on that Bed, i.e. the time a Bed remains vacant between Admissions.

It is calculated by deducting the "Actual Patient Days in the Period" from "Maximum Patient Days", and dividing the value by the total of "Number of Discharge", "DORB",

"Transfer" and "Death".

In my Study Period, the Total number of days were 242; the total number of Discharge,

DORB, Transfer, and Deaths come to 757; Actual Patient Days in the Period was 4182, and the Calculation is as follows:

Bed Turn over Interval = (23x242) - 4182 / 757 = (5566 - 4182) / 757 = 1.8

RESULTS:

From the above indices, the following averages were deducted for the Study Period:

Average Daily Census: 17.29

Average Bed Occupancy Rate (BOR): 75.53%

Average Length of Stay (ALS): 5.53

Average Bed Turnover Rate (BTR): 4.29/month, i.e. 52/year.

Average Bed Turnover Interval (BTI): 1.5

Total Days in the Study Period: 242

Total Admission: 4182

Average Admission/day: 17.28

Average Daily Census: 17.29

DISCUSSION:

The data presented above, need an interpretation which is as follows:

Average Length of Stay (AALS) observed in the study Period is 5.53 days. This, in relation to ALS in PGIMER Chandigarh (where it is 3.30 days), is high. It is also high in relation AIIMS,

where it is 4.85 days. This marginally high ALS is explained by the morbidity profile in the Study Period in this Unit, where it shows predominance of cases of Poly trauma, CVA, Head Injury cases. These cases require longer stay than the other cases.

Bed Occupancy Rate (BOR) in the Study Period is 75.53%. A comparison of BOR with other Hospitals is as follows:

BOR in PGIMER, Chandigarh: 90%
BOR in AIIMS: 86.47
BOR in BHU: 95%

RECOMMENDATION:

The BOR needs to be raised. For this, the daily Admission needs to be increased. This is possible with a deft Admission and Discharge Policy.

The ALS is moderately high. This needs to be reduced. A high ALS also encourages Hospital acquired Infections.

The Physical facility of the Unit needs to be improved; especially the Floor Area needs to be increased to run an ideal 23 Bedded ICU.

The strength of the Nursing needs to be increased.

There is only Isolation Bed. There are, at times, multiple patients who require Isolation. Hence,

Number of Isolation Room must be increased.

CONCLUSION:

The Statistics thus deducted in the Study shows how deftly this Institute is serving the Patients admitted from Kolkata and outside.

With a vision to be one of the leading Hospitals of India, the Hospital is striving sincerely to reach the Goal. At present, the Hospital is targeting at getting "NABH accreditation".

Abbreviations:

ICU Intensive Care Unit.
ISCCM Indian Society of Critical Care Medicine.
BOR Bed Occupancy Rate.
ALS Average Length of stay.
BTR Bed Turnover rate.
BTI Bed Turnover Internal.
NABH National Accreditation Board of Hospital.

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