

HOSPITAL AND CLINICAL PHARMACY

SECOND YEAR DIPLOMA IN PHARMACY

Dr. A. V. YADAV
B. V. YADAV



 **NIRALI**
PRAKASHAN
ADVANCEMENT OF KNOWLEDGE

TEXT BOOK OF

HOSPITAL AND CLINICAL PHARMACY

For

Second Year Diploma in Pharmacy

Dr. A. V. YADAV

M. Pharm. LL.B., Ph.D.
Head of Pharmacy Deptt;
Government College of Pharmacy
KARAD.

B. V. YADAV

M. Pharm., D.B.M.
Bharati Vidyapeeth's
Institute of Pharmacy (Polytechnic)
Erandwane, **PUNE.**

Price ₹ 190.00

 **NIRALI**TM
PRAKASHAN
ADVANCEMENT OF KNOWLEDGE

N1261

Hospital and Clinical Pharmacy

ISBN 978-81-85790-26-8

Twenty First Edition : July 2016

Reprint : April 2017

© **: Authors**

The text of this publication, or any part thereof, should not be reproduced or transmitted in any form or stored in any computer storage system or device for distribution including photocopy, recording, taping or information retrieval system or reproduced on any disc, tape, perforated media or other information storage device etc., without the written permission of Authors with whom the rights are reserved. Breach of this condition is liable for legal action.

Every effort has been made to avoid errors or omissions in this publication. In spite of this, errors may have crept in. Any mistake, error or discrepancy so noted and shall be brought to our notice shall be taken care of in the next edition. It is notified that neither the publisher nor the authors or seller shall be responsible for any damage or loss of action to any one, of any kind, in any manner, therefrom.

Published By :

NIRALI PRAKASHAN

Abhyudaya Pragati, 1312, Shivaji Nagar,

Off J.M. Road, PUNE – 411005

Tel - (020) 25512336/37/39, Fax - (020) 25511379

Email : niralipune@pragationline.com

Printed By :

YOGIRAJ PRINTERS AND BINDERS

Works: Sr. No. 10\1, Ghule Industrial Estate,

Nanded Village Road,

TAL-HAVELI, DIT-PUNE 411041.

Mobile - 9850056517, 9404225254

DISTRIBUTION CENTRES

PUNE

Nirali Prakashan : 119, Budhwar Peth, Jogeshwari Mandir Lane, Pune 411002, Maharashtra

Tel : (020) 2445 2044, 66022708, Fax : (020) 2445 1538

Email : bookorder@pragationline.com, niralilocal@pragationline.com

Nirali Prakashan : S. No. 28/27, Dhyari, Near Pari Company, Pune 411041

Tel : (020) 24690204 Fax : (020) 24690316

Email : dhyari@pragationline.com, bookorder@pragationline.com

MUMBAI

Nirali Prakashan : 385, S.V.P. Road, Rasdhara Co-op. Hsg. Society Ltd.,

Girgaum, Mumbai 400004, Maharashtra

Tel : (022) 2385 6339 / 2386 9976, Fax : (022) 2386 9976

Email : niralimumbai@pragationline.com

DISTRIBUTION BRANCHES

JALGAON

Nirali Prakashan : 34, V. V. Golani Market, Navi Peth, Jalgaon 425001, Maharashtra, Tel : (0257) 222 0395, Mob : 94234 91860

KOLHAPUR

Nirali Prakashan : New Mahadvar Road, Kedar Plaza, 1st Floor Opp. IDBI Bank

Kolhapur 416 012, Maharashtra. Mob : 9850046155

NAGPUR

Pratibha Book Distributors : Above Maratha Mandir, Shop No. 3, First Floor,

Rani Jhanshi Square, Sitabuldi, Nagpur 440012, Maharashtra

Tel : (0712) 254 7129

DELHI

Nirali Prakashan : 4593/21, Basement, Aggarwal Lane 15, Ansari Road, Daryaganj

Near Times of India Building, New Delhi 110002

Mob : 08505972553

BENGALURU

Pragati Book House : House No. 1, Sanjeevappa Lane, Avenue Road Cross,

Opp. Rice Church, Bengaluru – 560002.

Tel : (080) 64513344, 64513355, Mob : 9880582331, 9845021552

Email: bharatsavla@yahoo.com

CHENNAI

Pragati Books : 9/1, Montieth Road, Behind Taas Mahal, Egmore,

Chennai 600008 Tamil Nadu, Tel : (044) 6518 3535,

Mob : 94440 01782 / 98450 21552 / 98805 82331,

Email : bharatsavla@yahoo.com

Note: Every possible effort has been made to avoid errors or omissions in this book. In spite this, errors may have crept in. Any type of error or mistake so noted, and shall be brought to our notice, shall be taken care of in the next edition. It is notified that neither the publisher, nor the author or book seller shall be responsible for any damage or loss of action to any one of any kind, in any manner, therefrom. The reader must cross check all the facts and contents with original Government notification or publications.

niralipune@pragationline.com | www.pragationline.com

Also find us on  www.facebook.com/niralibooks

Preface ...

With the implementation of new Education Regulations (ER - 91), Diploma in Pharmacy is gradually getting a clinical orientation. The opportunity to prepare a new book on "Hospital and Clinical Pharmacy" provided us the occasion to serve to the students of Diploma course in Pharmacy.

We take pleasure in presenting this book to provide the students updated and collective information on various aspects of Hospital and Clinical Pharmacy in a simple and lucid language.

We sincerely hope that the students and staff will appreciate our efforts and provide us with necessary feed-back to make essential improvements in the book.

We are thankful to the Publisher Shri. Dineshbhai Furia and Shri. Jignesh Furia for bringing out the book in nice form.

Authors

Syllabus ...

PART - I : HOSPITAL PHARMACY

1. **Hospitals:** Definition, Function, Classifications based on various criteria, Organisation, Management and health delivery system in India.
2. **Hospital Pharmacy:**
 - (a) Definition
 - (b) Functions and Objectives of Hospital Pharmaceutical Services
 - (c) Location, Layout, Flow Chart of Materials and Men
 - (d) Personnel and facilities requirements including equipment based on individual and basic needs
 - (e) Requirements and abilities required for Hospital Pharmacists.
3. **Drug Distribution system in Hospitals**
 - (a) Out-patient services
 - (b) In patient services: (i) Types of services (ii) Detailed discussion of Unit dose system, Floor ward stock system, Satellite pharmacy services, Central sterile services, Bed Side Pharmacy.
4. **Manufacturing**
 - (a) Economical considerations, Estimation of demand.
 - (b) Sterile manufacture - Large and small volume parenterals, Facilities, requirements, Layout, Production planning, Man-power requirements.
 - (c) Non-sterile manufacture - Liquid orals, Externals, Bulk concentrates.
 - (d) Procurement of stores and testing of raw materials.
5. Nomenclature and Uses of Surgical Instruments and Hospital Equipments and Health Accessories.
6. P.T.C. (Pharmacy) and Therapeutic Committee), Hospital Formulary System and their Organisation, Functioning, Composition.
7. Drug Information service and Drug Information Bulletin.
8. Surgical dressing like Cotton, Gauge, bandages and Adhesive tapes including their pharmacopoeial test for quality. Other hospital supply e.g. I.V. sets, B. G. sets, Ryals tubes, Catheters, Syringes, etc.
9. Application of computers in maintenance of records, inventory control, medication monitoring, drug information and data storage and retrieval in hospital and retail pharmacy establishments.

PART - II : CLINICAL PHARMACY

1. Introduction to Clinical Pharmacy Practice - Definition, Scope.
2. Modern Dispensing Aspects - Pharmacists and Patient Counselling and Advice for the use of common drugs, Medication history.
3. Common daily terminology used in the Practice of Medicine.
4. Disease, Manifestations and Pathophysiology including salient symptoms to understand the diseases like Tuberculosis, Hepatitis, Rheumatoid Arthritis, Cardio-Vascular diseases, Epilepsy, Diabetes, Peptic Ulcer, Hypertension.
5. Physiological Parameters with their Significance.
6. Drug Interactions.
 - (a) Definition and Introduction.
 - (b) Mechanism of Drug Interaction.
 - (c) Drug-drug interaction with reference to analgesics, diuretics, cardiovascular drugs. Gastro-intestinal agent, Vitamins and Hypoglycemic agents.
 - (d) Drug-food interaction.
7. Adverse Drug Reactions
 - (a) Definition and Significance.
 - (b) Drug - induced diseases and Teratogenicity.
8. Drugs in Clinical Toxicity - Introduction, General treatment of poisoning, Systematic antidotes. Treatment for insecticide poisoning heavy metal poison, Narcotic drugs, Barbiturate, Organophosphorus poisons.
9. Drug dependences, Drug abuse, Addictive drugs and their treatment complications.
10. Bio-availability of drugs, including factors affecting it.

Contents ...

PART - I : HOSPITAL PHARMACY

1. Hospital	1.1 - 1.12
2. Hospital Pharmacy	2.1 - 2.10
3. Drug Distribution System in Hospitals	3.1 - 3.12
4. Hospital Manufacturing	4.1 - 4.4
5. Sterile Manufacture	5.1 - 5.10
6. Non-Sterile Manufacture	6.1 - 6.14
7. Store Purchases and Inventory Control	7.1 - 7.12
8. Hospital Instruments and Health Accessories	8.1 - 8.14
9. Pharmacy and Therapeutic Committee	9.1 - 9.4
10. Hospital Formulary System	10.1 - 10.6
11. Drug Information Specialist and Services	11.1 - 11.8
12. Surgical Dressings	12.1 - 12.12
13. Computers in Pharmacy	13.1 - 13.8

PART - II : HOSPITAL PHARMACY

1. Introduction to Clinical Pharmacy Practice	1.1 - 1.4
2. Modern Dispensing Aspects	2.1 - 2.8
3. Medical Terminology	3.1 - 3.8
4. Pathophysiology of Diseases	4.1 - 4.16
5. Physiological Parameters	5.1 - 5.10
6. Drug Interactions	6.1 - 6.14
7. Adverse Drug Reactions	7.1 - 7.10
8. Toxicology	8.1 - 8.12
9. Drug Dependence and Abuse	9.1 - 9.6
10. Bioavailability of Drugs	10.1 - 10.4
Index	I.1 - I.2

Part I - Hospital Pharmacy

1

HOSPITAL

Definition

A hospital is an establishment where medical or surgical care and treatment is provided for the ill or injured by a team of trained staff using specialized scientific equipment. It provides a range of health care services which include medical, surgical, psychiatric, testing and diagnostic services and treatment. These services are co-ordinated within a hospital with the aim to restore and maintain good health.

It is a place where resources like (a) Services of health care professionals, (b) Physical facilities and specialized equipment and (c) Funds are organised, put together and utilized to fulfil the health care needs of a community. Thus a hospital is a complex organisation which works with an objective of restoring and improving the health status of a community at large. Hospitals in earlier days were charitable institutes which took care of the sick who were needy, aged or infirm. They were set up to basically look after the homeless sick.

Today modern hospitals are not just centres of cure but centres of promotion of health. They provide 'medical care' which encompasses preventive, curative and even rehabilitative measures.

The growth and development of hospitals to expand to their modern day role is due to factors like

1. Realisation of importance of good health by the public at large.
2. Public awareness regarding preventive health care.
3. Advances in medical and related biological sciences.
4. Assurance about the quality of care provided by the hospitals; creating faith in the minds of people.
5. Time demanded needs about health care like wounded soldiers in world wars or victims of Epidemics etc.

Functions of a Hospital

The main functions of a hospital are:

- (i) Patient care.
- (ii) Training of medical and health professionals and patients.
- (iii) Medical Research.
- (iv) Public health.

Patient Care: The main function of a hospital is to provide care to the sick or injured and restore the health of the patient. It raises the quality of care and general standards of medical practice. It is a centre of community health and contributes a great deal to preventive and social medicine,

Training of Medical and Health Professionals and Patient: Training or education is an important function of a hospital. Education in a hospital has two different forms namely, (i) educating the medical and health professionals and (ii) educating the patient. A hospital could be considered as a workshop where the student learns by observing and practicing under the supervision of his superiors. Training to the nurses, medical and social workers, X-ray and laboratory technicians and other staff is an essential facet of hospitals. Such trainings programmes should be arranged periodically under the supervision of experienced superiors. A hospital also aims to educate the general public through lectures and demonstrations on the preventive aspects of common and serious diseases. A hospital provides the means and methods by which persons can work together in groups to take care of patients and the community. Hospitals provide facilities for continuing education to all persons involved in health care, patients and their relatives.

Medical Research

Hospital research is important as it helps in developing new methods of treatment and improving a hospital services. Some of the common areas of research in a hospital are development of new techniques in surgery, laboratory diagnostic procedures, evaluation of investigational drugs in diseases etc. It helps to lower incidences of disease through early detection and treatment. It also helps to develop and maintain an effective system of clinical and administrative records and reports. Hospitals also participate in the financial plan and safety programmes.

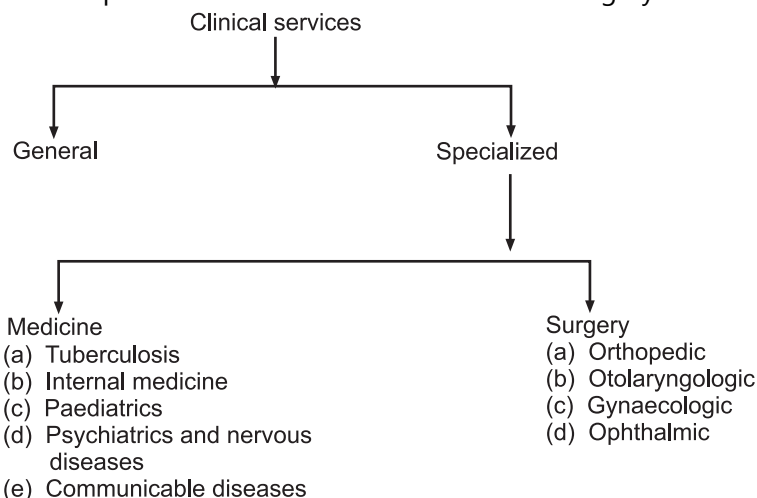
Public health: Hospitals are required to support all the activities carried out by various public health and voluntary agencies such as immunization programmes, blood donation camps, social and economic rehabilitation, health education etc. by providing facilities and advice.

Classification of Hospital

Hospitals are classified in different ways and a hospital could fall under more than one category. There are three basic classifications of hospital based on (i) the type of clinical services offered, (ii) the length of stay and (iii) the ownership/control of hospital.

1. Clinical Services Offered: Clinical services offered by hospitals are either specialized or general. Most Government hospitals usually offer general hospital services,

providing a wide range of service areas such as surgical, internal medicine, orthopedic, dental and obstetric care. The specialized care include medicine and surgery.



2. Length of stay:

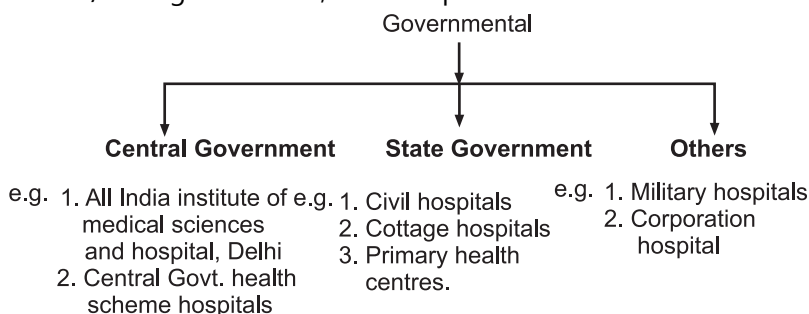
(a) Short term (Acute): Average length of stay of patient is less than 30 days.

(b) Long term (Chronic): Length of stay of patient is more than 30 days.

e.g. Psychiatric condition.

3. Ownership and Control Basis: The group that controls, owns or operates the hospital may be either Governmental or voluntary organisations (Non-Governmental).

(a) Governmental: This includes those hospitals that are owned and/or operated by an agency of the central/state government, or other political subdivisions of Government.



(b) Non-Governmental:

(i) Private: (a) Profit (b) Non-profit.

(ii) Community

Hospitals can also be classified on the basis of:

1. Accreditation: In the United States, hospitals are also classified on the basis of accreditation procedure which considers the compliance to specified standards of health care.

(a) Accredited

(b) Non-accredited.

2. Teaching hospital: A teaching hospital is one where clinical instruction is imparted to medical school students. Teaching hospitals are the places where new medical graduates undergo 1 year of hospital training and get experience in a broader perspective in clinical care of patients, teaching and research.

3. Capacity: The hospitals are also classified on the basis of bed capacity as :

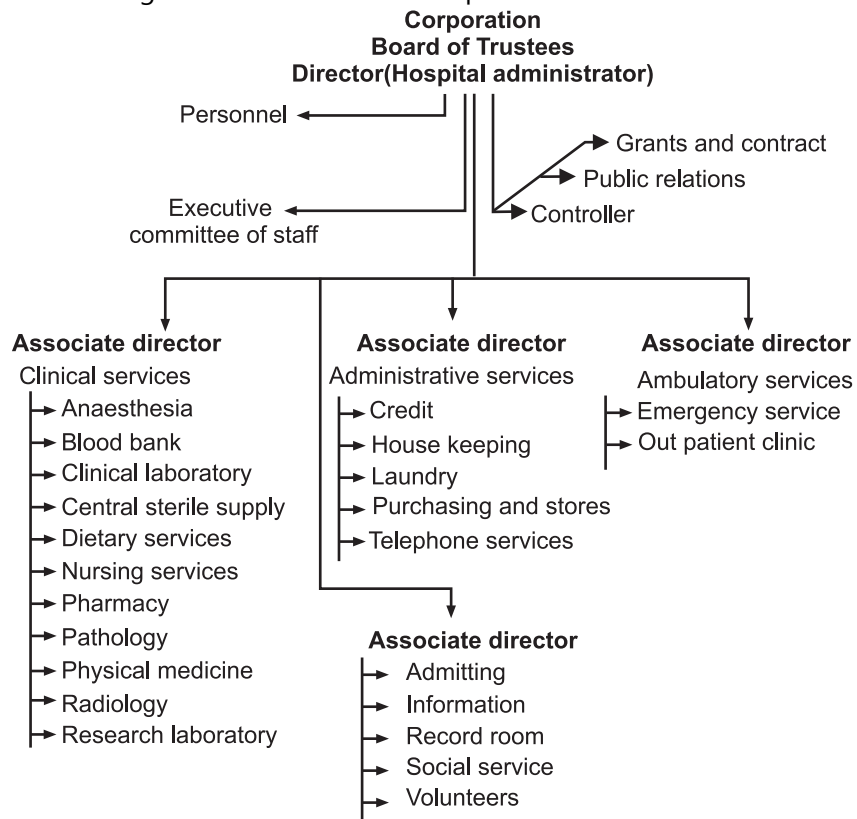
Under 50 beds	200-299 beds
50-99 beds	300-399 beds
100-199 beds	400-499 beds
	500 and over beds

Clinic: A clinic is an establishment where ambulatory patients are admitted for special study and treatment by a group of physicians practicing together, and where the patient is not confined as in a hospital.

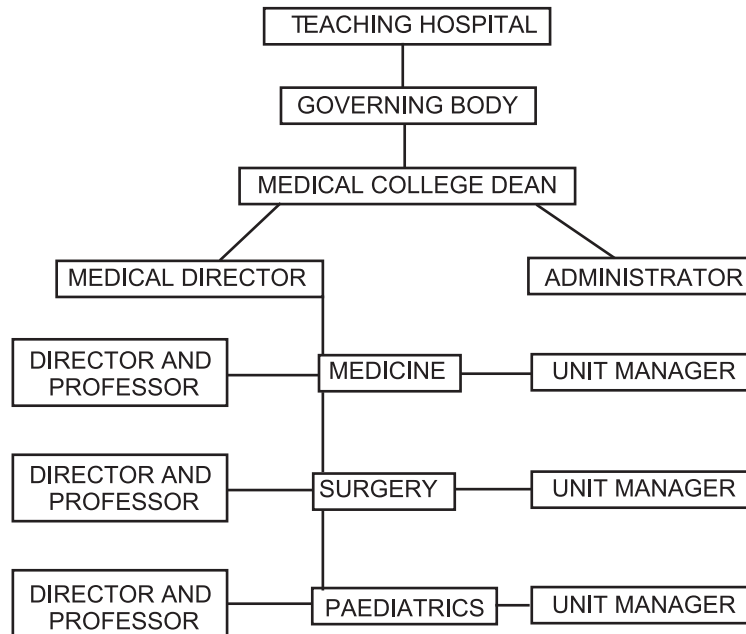
Hospital Organisation: The organisation and management of a hospital differs based on the type of hospital and on the ownership and control of hospital.

In the case of a smaller hospital there are fewer administrative positions of associate or assistant directors whereas in larger hospitals, the general areas of clinical and administrative services may be further subdivided in units. The corporation and the board of trustees segment of the organisation is standard for all private hospitals. Government hospitals usually have a board of trustees but no corporate body.

A representative organisational chart of a hospital is shown here:



The organisational structure of a medical centre teaching hospital is shown in the chart below.



Governing Body and Management

Regardless of the kind of organisation and control a hospital is under, there is always some sort of a governing body to which the administrator must report.

In state, country and city hospitals the governing body is usually from some political subdivision, whereas in the non-profit, non-government hospital there is usually a governing board which takes the overall responsibility for the proper functioning of the hospital such that adequate service can be rendered to the patient at as low a cost as possible with maximum efficiency.

Most hospitals in the United States need not just a license but also require recognition by the Joint Commission on Accreditation on Hospitals (JCAH) as an accredited hospital. The purposes of JCAH are :

1. To establish the standards of the hospital.
2. To conduct surveys and accreditation programmes for following purposes:
 - (a) To promote high quality care in all aspects.
 - (b) To apply certain basic principles of physical plant safety and maintenance.
 - (c) To maintain the essential services through the coordinated effort of the staff.
3. To recognise compliance of standards by issuing certificates of accreditation.
4. To conduct educational and research programmes and publish the results thereof.

Functions of the Governing Body

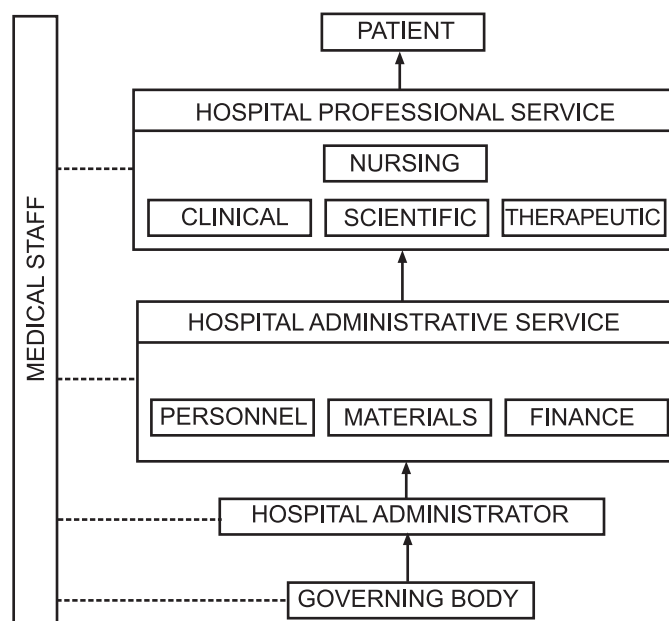
1. To select competent personnel including medical staff.
2. To control the hospital funds and
3. To supervise the physical plant.

The governing body in consultation with the chief administrative officer must establish:

- (a) The working hours and conditions, salary, schedules and proper checks on personnel.
- (b) Schedule of room rates and other charges for hospital inpatient and ambulatory care.
- (c) Methods for obtaining grants to supplement income from paying patients and help to balance the hospital budget.
- (d) Method of investing funds such that the interest can be used for hospital operations.
- (e) The need for additional construction or replacement of the physical plant of hospital.

Departments

The hospital board and administrative staff establish a functional departmental organisation. The number and size of departments in any hospital organisation vary with the type and size of the hospital and with the area served (in terms of population and specific needs). Basically, these departments may be divided into general service, administration departments and clinical departments. The following chart shows hospital organisation and its administration and professional services in relation to the patient.



Medical Staff of the Hospital

The duties of the organised medical staff after its approval by the governing body are as follows:

- (a) To provide professional care to sick and injured patients.
- (b) To participate in the educational programme of the hospital.
- (c) To audit their own professional work.
- (d) To maintain their own efficiency.
- (e) To advise and assist the administrator and governing body regarding medical policies.

The medical staff consists of the following groups :

- | | |
|---------------------|--------------------|
| 1. Honorary staff | 4. Associate staff |
| 2. Consulting staff | 5. Courtesy staff |
| 3. Active staff | 6. Resident staff |

The honorary medical staff consists of physicians who are active in the hospital despite having retired. They continue to serve in the hospital because of their vast experience, indepth knowledge and outstanding work. This is a way of honouring them.

The consulting medical staff consists of specialists from various faculties, who are past speciality board members or belong to a national organisation.

The active or attending medical staff is the group most actively involved in the hospital. They are concerned with the care of all the patients in the hospital.

The associate medical staff is a group of junior or less experienced members.

Courtesy medical staff is a group of physicians who have the privilege of attending to their own private patients at the hospital. They are not involved in the treatment of other patients in the hospital.

The resident medical staff is a group of physicians who are employees of the hospital residing in the campus.

The Supporting Services

The clinical department of the hospital would not be able to function without the following supporting services :

- (a) Anaesthesia Service:** Anaesthesia care is usually provided by anaesthesiologist or qualified physician anesthetist and qualified nurse anaesthetist. The anaesthesia service of hospital is generally directed by a physician member of the medical staff who has had a special training and is responsible for the following:
- (i) quality of anaesthesia care.
 - (ii) availability of equipment required for administration of anaesthetic.
 - (iii) development of regulations and evaluation of anaesthesia care.
- (b) Blood Bank:** Most hospitals have a blood bank as blood is required frequently. The blood supply service is generally under the supervision of a licensed physician. In

some hospitals, the blood supply service is assigned to the pathology department. Depending on the hospital size, an adequate supply of blood may be maintained in the hospital's own blood bank.

(c) Central Sterile Supply: This supplies all the necessary requirements in sterile condition to nursing units which include needles, syringes, linen and other surgical supplies.

(d) Dietary Services: A dietician is a qualified individual who has studied the science and principles of nutrition. A dietician applies the principles of nutrition effectively to the dietary service provided by the hospital.

The dietician is generally responsible for recording dietary histories of patients who have food allergies or restricted diets.

(e) Nursing Services: Nursing service is important in the hospital for the following reasons:

- (i) It encompasses health promotion, care and prevention of disease, rehabilitation, teaching, counselling and emotional support.
- (ii) It is an integral part of total health care and is planned and administered in combination with related medical, educational and welfare services.
- (iii) Nursing personnel respect individuality, dignity and rights of every person regardless of race, colour and social or economic status.

(f) Medical Records Service: Every hospital is required to maintain adequate medical records of their patients.

The following are the purposes of keeping the medical records:

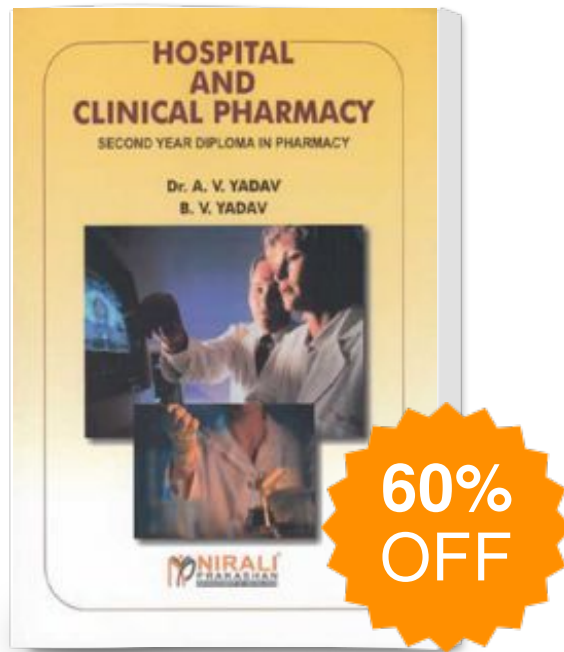
1. It serves as a basis for planning and continuity of patient care.
2. It provides the means of communication among the physician and nursing staff.
3. It serves as a basis for study and evaluation of the care rendered to the patient.
4. It provides data for use in research education.
5. It furnishes documentary evidence for the course of patient's illness and treatment during each hospital stay.

The medical records must include all the detailed clinical information to enable another practitioner to give effective continuing care to patient and a consultant to give an opinion after his examination of the patient.

A complete medical record includes:

- (i) Identification and sociological data.
- (ii) Family history and present illness.
- (iii) Physical examination data.
- (iv) Special examination data: Clinical, laboratory data, X-ray findings.
- (v) Provisional diagnosis.

Hospital And Clinical Pharmacy



Publisher : Nirali Prakashan

ISBN : 9788185790268

Author : Dr. A. V. Yadav, B. V. Yadav

Type the URL : <http://www.kopykitab.com/product/20051>



Get this eBook