

UNIT 1

**INTRODUCTION AND COMMUNITY
PHARMACY MANAGEMENT**



1.1 COMMUNITY PHARMACY

1.1.1 Definition

The main responsibilities of a community pharmacy include *compounding*, *counseling*, and dispensing of drugs to the patients with care, accuracy, and legality along with the proper procurement, storage, dispensing and documentation of medicines. The community pharmacist must be a qualified and pertinent with sound education, skills and competence to deliver the professional service to the community.

A community pharmacist should

- (i) have a sound background of pharmaceutical care, pharmacotherapy, and health promotion.
- (ii) have good communication skills with patients and other healthcare providers.
- (iii) maintain a high degree of standard in products, services, and communication.
- (iv) record and maintain his documents in order.

“In short community pharmacy is the drug use, control and effective application of knowledge of ethics, that assures optimal drug safety in the distribution and use of medicines and hence, it ensures maximum well-being of patients while they are on drug therapy.”

Community Pharmacy is defined broadly to include all those establishment that are privately owned and whose function, in varying degrees is to serve societies needs for both drug product and pharmaceutical service. It is the branch of pharmacy that deals with different aspects of *patient care, dispensing of drugs and advising patient on the safe and rational drug use*.

1.1.2 Scope of Community Pharmacy

Community Pharmacy has a large number of scopes or approaches, which are related to patient counseling and patient drug control.

1.1.2.1 Drug information about their action

Besides proper understanding of the biological and physical science, community pharmacy also provides grasp on chemistry, pharmacology, toxicology, routes of administration, stability and other information regarding drugs.

The community pharmacy is an excellent institute and an educational laboratory for physician and pharmacist carrying out an obligation to provide necessary and fully authoritative information on drug. Community pharmacy acquires the knowledge by personal and individual contacts with the physician but also from the pharmacy and therapeutic committee. Community pharmacy also ensures the pharmaceutical quality of drugs and dispensing of drugs and also responsible in selection of a suitable product in the market.

1.1.2.2 Drug utilization

Community pharmacy helps to develop charging policies for pharmaceutical services. It should also be able to implement an adequate system for stock and inventory control. Community pharmacy also decides the proper regimen of drug to the patient. It also gives the knowledge to how to administer the drug to the patient.

Stock control reports on prescription and controlled drugs dispensed, drug purchases, inspection and improvement in operation and such other aspect which demand attention.

1.1.2.3 Drug distribution

Considerable quantities of drugs are localized physically outside the pharmacy. It is necessary to have control for internal distribution of drugs for patients. The patients who are hospitalized may require intensive drug therapy, controlled procedures which will allow rapid rechecks of drug source and quality. The potentialities of automated dispensing at the wards level bring further emphasis to establishment of correct controls for drug distribution in this situation.

1.1.2.4 Drug selection

In the field of community pharmacy the 'rational drug therapy' plays a important role for the selection of drugs which will be given to the patients to encounter the disease. It is defined as the use of an appropriate, efficacious, safe and cost-effective drug given for the right indication, in the right dose and at right interval of time and for the right duration of time (Dosage regimen).

It involves various type of activities like-

- (a) Adoption of essential drugs concept
- (b) Training of health professionals (counseling of health in Rational Drug Therapy/ Rational Drug Use)
- (c) Maintenance of data based on clinical guidelines

- (d) Consumer education and regulatory strategies if the Rational Drug Use (RDU) is not proper it leads to illness, adverse drug reactions (ADRs), increase cost of medication and treatment to the patient.

It is also known as “Essential Drug Concept” (EDC).

1.1.2.5 Patient counseling and evaluating

Dialogues between patients and physicians regarding the indication, proper use and potential adverse effects of non-prescription drugs (NPDs) should be different as compared, when if the physician has written the prescription. In the era, the cost considerations are greater than ever, NPDs should be considered and referred when appropriate, as alternatives to prescription drugs.

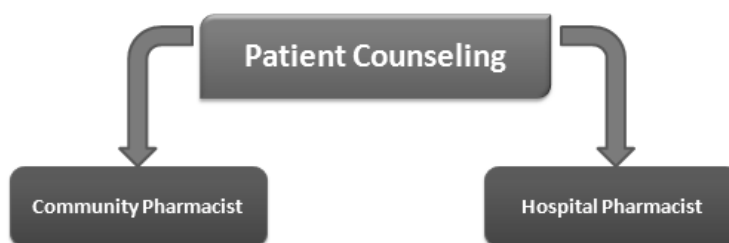


Fig. 1.1 Pharmacists involved in patient counseling

1.1.3 Role and Responsibilities of Pharmacist

(I) Central Pharmacists Responsibilities

A. Dispensing area

1. Ensures that established policies and procedures are followed.
2. Checks for the accuracy of doses prepared
 - (a) Intravenous admixtures
 - (b) Unit dose
3. Provides for proper drug control
 - (a) Ensures that drugs are stored and dispensed properly (eg. Investigational drugs)
 - (b) Ensure that all state and federal drug laws are followed
4. Ensure that good techniques are used in compounding intravenous admixtures and extemporaneous preparations

5. Provides for proper record keeping and billing
 - (a) Patient-medication records
 - (b) Extemporaneous compounding records
 - (c) Intravenous admixture records billing
 - (d) Investigational-drug records
 - (e) Reports (eg. Monthly workload report)
6. Maintains professional competence, particularly in knowledge of drug stability and incompatibilities.
7. Ensures that new personnel are trained properly in the policies and procedures of the dispensing area.
8. Co-ordinates the activities of the area with the available staff to make the best possible use of personnel and resources.
9. Keeps the dispensing area neat and orderly.
10. Communicates with all pharmacy staff regarding new development in the area and assists in employee evaluations.
11. Provides drug information as necessary to the pharmacy, medical and nursing staffs.
12. Co-ordinates the overall pharmaceutical needs of the patients care areas with the dispensing area (eg. Delivery schedules).

B. Patient-care area

1. Supervision of drug administration.
 - (a) Reviews and interprets each unit doses and intravenous (IV) admixture medication order to ensure that it is entered accurately into the unit-dose or IV- admixture system.
 - (b) Reviews each patients drug administration form periodically to ensure that all doses are being administered and charted correctly.
2. Reviews all doses missed, reschedule the doses as necessary and signs all drugs not given notices.
3. Ensures that new drug administration forms are transcribed accurately for continuity of drug therapy and that drug charges are assessed correctly.
 - (a) Confirms periodically that administered doses are noted correctly on the patient chart.

- (b) Ensures that records for administered narcotics are kept correctly and that the physician is informed of all automatic stop orders.
- (c) Ensures that proper drug administration techniques are used.
- (d) Acts as liaison between the pharmacist, the nursing and medical staffs.
- (e) Communicates with nurses and physicians concerning medication administration problems.
- (f) Periodically inspects the medication area on the nursing units to ensure that adequate levels of floor stocks drugs and supply are maintained.
- (g) Ensure that order supportive services performed from the dispensing area as required.
- (h) Ensure that the other supportive services performed by the department of pharmacy are carried out correctly.
- (i) Co-ordinate all pharmacy services on the nursing unit level.
- (j) Ensure that the medication area is neat and orderly.
- (k) Ensure that proper security is maintained in the medication area to prevent pilferage.

C. Direct patient care

Identifies drug brought into the hospital by patients.

Obtain patient medication histories and communicates all pertinent information to the physician.

1. Assists in drug-product and entity selection.
2. Assists the physician in selecting dosage regimens and schedules and then assigns drug administration times for these schedules (pharmacokinetic service).
3. Monitors patient s' total drug therapy for-
 - (a) Effectiveness/ ineffectiveness
 - (b) Side-effects
 - (c) Toxicities
 - (d) Allergic drug reactions
 - (e) Drug interaction
 - (f) Appropriate therapeutic outcomes

4. Counsels patients on
 - (a) medication to be self administered in the hospital
 - (b) Discharge medications
5. Participates in cardiopulmonary emergencies by
 - (a) Procuring and preparing the drug required.
 - (b) Charting all medications given.
 - (c) Performing cardiopulmonary resuscitation, if necessary.

D. General responsibilities

1. Provides education to
 - (a) Pharmacists, pharmacy externs, clerks, students, residents and other students.
 - (b) Nurses and nursing students.
 - (c) Physicians and medical students.
2. Provides drug information to physicians, nurses and other health-care personnel.

(II) Ambulatory Pharmacists Responsibilities

A. Dispensing area

1. Ensure that established policies and procedures are followed
2. Checks for the accuracy in the work of supportive personnel
3. Ensure that proper techniques are used in extemporaneous compounding
4. Maintenance of adequate record keeping and billing
 - (a) Patient medication records
 - (b) Investigational drug records
 - (c) Outpatients billing
 - (d) Reports
 - (e) Prescription files
5. Maintains professional competence
6. Ensure that new personnel are trained properly in the policies and procedures of the ambulatory pharmacy.
7. Co-ordinate the activities of the area with available staff to make the best use of personnel and resources.
8. Keeps the ambulatory pharmacy area neat and orderly at all times.

B. Patient care area

1. Inspects the medication areas in the nursing unit periodically to ensure an adequate supply of stock drugs and their proper storage.
2. Identifies the drugs brought into the clinic by patients.
3. Obtains patients medication histories and communicates pertinent information to the physician.
4. Assists in drug-product entity selection.
5. Assists the physician in selecting dosage regimens and schedules.
6. Monitors the patients total drug therapy for:
 - (a) Effectiveness
 - (b) Side-effects
 - (c) Toxicities
 - (d) Allergic drug reactions
 - (e) Drug interactions
 - (f) Appropriate patient outcomes
7. Counsels patients on the proper use of their medications.
8. Prepare medications for intravenous administration.
9. Provides medication and/or supply for patient home care.

C. General responsibilities

1. Provides drug information necessary to pharmacy, medicals and nursing staffs.
2. Co-ordinates overall pharmaceutical needs of the ambulatory service area.
3. Provides adequate drug controls
 - (a) Ensures that the drugs are handled properly (eg. Investigational-drug storage).
 - (b) Ensures that all state and federal laws are followed
4. Maintains professional competence in area.
5. Participates in cardiopulmonary emergencies by
 - (a) Procuring and preparing the drug required.
 - (b) Charting all medications given.
 - (c) Performing cardiopulmonary resuscitation, if necessary.

6. Provides in-service education to
 - (a) Pharmacists, pharmacy externs, clerks, students, residents and other students.
 - (b) Nurses and nursing students.
 - (c) Physicians and medical students.

In a small hospital with only one pharmacist it is a challenge to be knowledgeable in all the activities of the hospital pharmacy. In large hospital with a number of pharmacists who specialize in certain areas of practice, each may become expert in one or more fields.

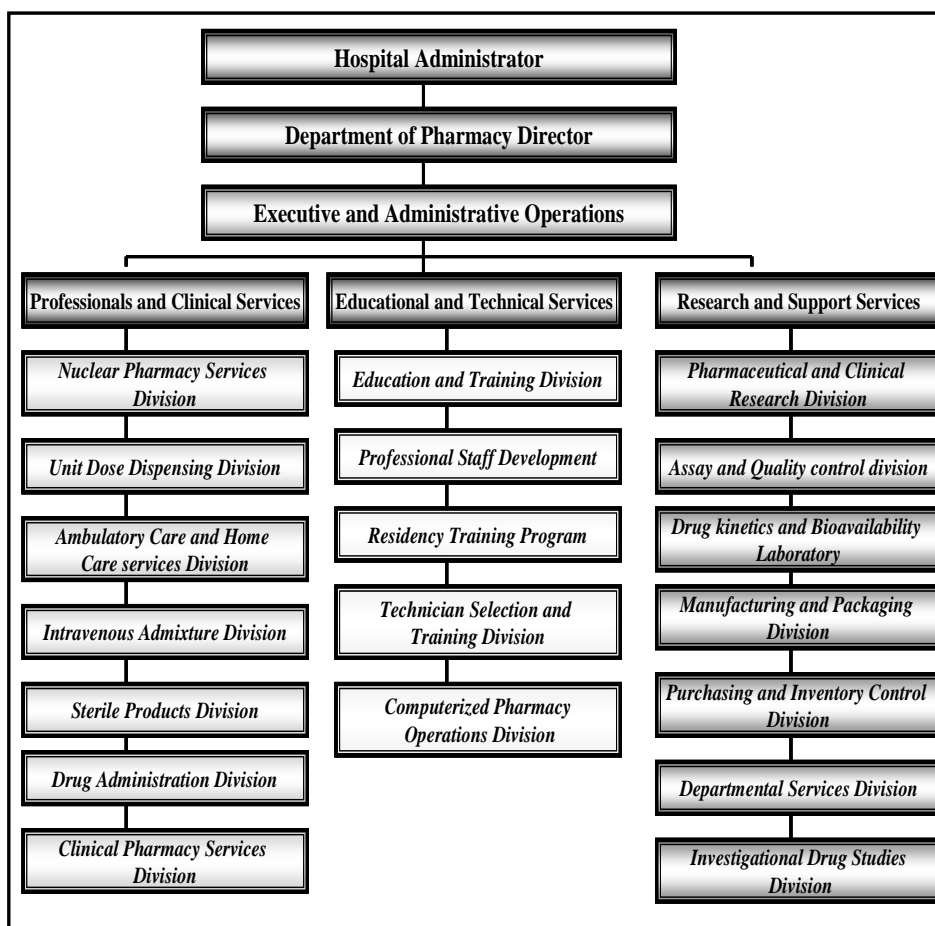


Fig. 1.2 Typical Organizational Structure of a Pharmacy Department

1.1.4 Code of Pharmaceutical Ethics

As adopted by Pharmacy Council of India under chapter-I: General Introduction, The profession of pharmacy is noble in its ideals and pious in its character. Apart from being a career for earning livelihood it has inherent in it the attitude of service and sacrifice in the interests of the suffering humanity. In handling, selling, distributing, compounding and dispensing medical substances including poisons and potent drugs a pharmacist is, in collaboration with medical men and others, charged with the onerous responsibility of safeguarding the health of people, as such he has to uphold the interests of his patrons above all things. The lofty ideals set up by Charaka, the ancient Philosopher Physician and Pharmacist in his erunciation : "Even if your own life be in danger you should not betray or neglect the interests of your patients" should be fondly cherished by all Pharmacist.

Government restricts the practice of Pharmacy to those who qualify under regulatory requirements and grant them privileges necessarily denied to others. In return Government expects the Pharmacist to recognise his responsibilities and to fulfill his professional obligations honorably and with due regard for the well being of Society.

Standards of professional conduct for pharmacy are necessary in the public interest to ensure an efficient pharmaceutical service. Every pharmacist should not only be willing to play his part in giving such a service but should also avoid any act or omission which would prejudice the giving of the services or impair confidence in any respect for pharmacists as a body.

The nature of pharmaceutical practice is such that its demands may be beyond the capacity of the individual to carry out or to carry out as quickly or as efficiently as the needs of the public require. There should, therefore at all times, be a readiness to assist colleagues with information or advice.

A Pharmacist must, above all be a good citizen and must uphold and defend the laws of the state and the Nation.

1.1.4.1 Pharmacist in relation to his job

1.1.4.1.1 *Scope of pharmaceutical service:* When premises are registered under statutory requirements and opened as a pharmacy, reasonably comprehensive pharmaceutical services should be provided. This involves the supply of

commonly required medicines of this nature without undue delay. It also involves willingness to furnish emergency supplies at all times.

1.1.4.1.2 *Conduct of the pharmacy:* It should be clear to the public that practices of Pharmacy are carried out in the establishment. Signs, notices, description, which do not or imply pharmaceutical qualifications, should be limited to those of which the use is restricted by law. A notice stating that dispensing under employees by government is carried out may be exhibited at the premises. In every pharmacy, there should be a pharmacist in personal control of pharmacy that will be regarded as primarily responsible for the observance of proper standards of conduct in connection with it.

1.1.4.1.3 *Handling of prescriptions:* A prescription is presented for dispensing; it should be received by a pharmacist without any discussion or comment over it, regarding the merits and demerits of its therapeutic efficacy. In case of any error in it, due to any omission, incompatibility or over dosage, the prescription should be referred back to the prescriber.

1.1.4.1.4 *Fair trade practice:* No attempt should be made to capture the business of a contemporary by cut throat competitions that are by offering any sort of prizes or gift. Label trade marks and other signs and symbols of contemporaries should not be imitated or copied.

1.1.4.1.5 *Purchase of drug:* Drug should be purchased from genuine and reputable source and a pharmacist should always be on if guard not to aid or abet, directly or indirectly.

1.1.4.1.6 *Hawking of drug:* Hawking of drugs and medicinals should not be encouraged, not should any attempt be made to solicit orders for such substances from door to door.

1.1.4.1.7 *Advertising and display*

- (a) Any wording design or illustration reflecting unfavorably on pharmacist collectively or upon any group of individual.
- (b) Misleading or exaggerated statements or claims.
- (c) A guarantee of therapeutic efficacy.
- (d) An appeal to fear.
- (e) A prize competition or similar scheme.
- (f) For correction or approval of the change suggested.

1.1.4.1.8 Handling of drug: All possible care should be taken to dispense a prescription correctly by weighing and measuring all ingredients. Incorrect proportion by the help of scales and measures, visual estimation must be avoided. A pharmacist should always use drugs and medicinal preparations of standard quality. He should never fill his prescription with spurious sub-standard and unethical preparation.

1.1.4.1.9 Apprentice pharmacist: While incharge of a dispensary, drug store or hospital pharmacy where apprentice pharmacist are admitted for practical training. A pharmacist should see that the trainees are given full facilities for their work, so that on the completion of their training they have acquired sufficient technique and skill to neck themselves dependable pharmacist.

1.1.4.2 Pharmacist in relation to his trade

1.1.4.2.1 Price structure: Price charged from customers should be fair and in keeping with the quality and quantity of commodity supplied and the labor and skill required in making it ready for use.

1.1.4.3 Pharmacist in relation to medical profession

1.1.4.3.1 Limitation of professional activity: Whereas it is expected that practitioners in general would not take to practice of pharmacy by owing drug stores as this ultimately leads to coded prescriptions and monopolistic, detrimental to the pharmaceutical profession and also to the interest of patients; it should be made a general rule that pharmacist under no circumstances, take to medical practices that is diagnosing diseases and prescribing remedies, therefore even if requested patrons do so.

No pharmacist should recommend particular medical practitioner unless specifically ask to do so.

1.1.4.3.2 Clandestine arrangements: No pharmacist should enter into any secret arrangements or conduct with the physician, to offer him any commission or any advantage by recommending his dispensary or drug store himself to the patients.

1.1.4.3.3 Liaison with public: Being a liaison between medical profession and people, a pharmacist should always keep himself abreast with the modern developments in pharmacy and other periodicals.

1.1.4.4 Pharmacist in relation to his profession

It is not sufficient for a pharmacist to be law abiding and to deter from doing things derogatory to the society and his profession, but it should be his duty to make others also fulfill the provisions of the pharmaceutical and other law regulations.

1.1.4.4.1 *Law-abiding citizen:* A pharmacist is a unit whole and his life cannot be divided into compartments. A pharmacist, engaged in profession has to be an enlightened citizen endowed with a fair knowledge of the law of the land and he should be particularly conversant with the enactments pertaining to food, drug, pharmacy, health, sanitation and the like and endeavor to abide by them in every phase of his life.

1.1.4.4.2 *Relationship with professional organizations:* In order to inculcate a corporate life in his own professional colleagues, should join and advance the cause of all such organizations, the aims and objects of which are conducive to scientific, moral and cultural well-being of pharmacists and at the same time are in no way contrary to the code of Pharmaceutical ethics.

1.1.4.4.3 *Decorum and proprietary:* A pharmacist should always refrain from doing all such acts and deeds which are not in consonance with the decorum of pharmaceutical profession and are likely to bring discredit or upbraid to the profession or to him.

1.1.5 Pharmacist OATH

- I Swear by the code of Ethics of Pharmacy Council of India in relation to the community and shall act as an integral part of health care team.
- I shall uphold the laws and standards governing my profession.
- I shall strive to perfect and enlarge my knowledge to contribute to the advancement of pharmacy and public health.
- I shall follow the system, which I consider best for pharmaceutical care and counseling of patients.
- I shall endeavor to discover and manufacture drugs of quality to alleviate sufferings of humanity.
- I shall hold in confidence the knowledge gained about the patients in connection with professional practice and never divulge unless compelled to do so by the law.

- I shall associate with organizations having their objectives for betterment of the profession of Pharmacy and make contribution to carry out the work of those organizations.
- While I continue to keep this Oath inviolate, may it be granted to me to enjoy life and the practice of pharmacy respected by all, at all times!

Should I trespass and violate this oath, may the reverse be my lot!

1.2 COMMUNITY PHARMACY MANAGEMENT

The community pharmacy medicines management (CPMM) is a unique point with an objective to introduce a structured intervention process into the relationship study between the community pharmacist, the patient and the general practitioner. The study is designed as a randomized controlled trial (RCT).

1.2.1 Objectives

The *primary objectives* of the CPMM are:

- (a) compare the proportion of the patients receiving appropriate treatment, as defined by currently available evidence and guidelines, between intervention and control groups at baseline and follow up.
- (b) quantify “Health gain” by describing the change in patients overall health status after the intervention as defined by standard measures, both general and condition specific.
- (c) conduct an economic evaluation of the medicines management intervention (including estimates of drug cost changes).

The *secondary objectives* are to

- (a) describe the opinions of the stakeholders (patients, general practitioners and their staff and community pharmacists) of medicines management before and after its introduction.
- (b) describe the role of over the counter (OTC) medicines in the overall patient management of this condition.

1.2.1.1 Function of materials management

1. Procurement of raw materials and other inputs required for production.
2. Maintaining stores and stock levels.

3. Receiving and issuing of the materials.
4. Transportation and material handling.
5. Disposal of scrap and surplus material.

1.2.2 Legal Requirements

1.2.2.1 Legal requirements in purchasing

Law of contract, an agreement between two or more persons during business transaction. There must be lawful proposal by one party and lawful acceptance by the other party. So two parties can enter into the agreement. The form of agreement may be oral or in the form of writing.

1.2.2.2 Legal requirements involved in payment of price

There are three legal aspects involved in the payment of price:



The buyer has to pay the due amount in time. If the buyer fails to inspect the goods within the reasonable time and find out whether all the items are in good condition and whether they confirm with their terms and conditions.

1.2.2.3 Legal requirements in pricing of bulk drugs

The drug price control order, 1987 authorizes the central Government to fix the maximum sale price of the bulk drugs. While fixing prices of bulk drugs, the following points should be taken into consideration:

- (i) A past tax return of 14% on net worth.
- (ii) A return of 22% on capital employed.
- (iii) An internal return of 12% based on long term marginal costing in respect of new plant.

1.2.2.4 Legal requirements in pricing drug formulation

The drug price control order, 1987 authorized the central Government to fix the maximum sales price of drug formulation. It is based on the following formula:

$$RP = (MC+CC+PM+PC)X (1- MAPE/ 100) + ED$$

Where RP = Retail price

MC = Material cost

CC = Conversion cost

PM = Cost of packaging materials

PC = Packaging charges

MAPE = Maximum allowable post-manufacturing expenses

ED = Excise duty

1.2.3 Staff Management

The right type of organization is selected, then it becomes necessary to fill in the various job positions with right kind of people, who can effectively performed their assigned activities. This is the management function of staffing.

1.2.3.1 Definition

The process of hiring and developing the required personnel to fill in various positions in the organization. It involves the scientific and systemic procurement, allocation, utilization, conversation and development of human resources.

The main objective of the staffing is to ensure the optimum utilization of human resources as well as to provide personal and social satisfaction to the employees.

1.2.3.2 Salient features of staffing

- Staffing is a function of management.
- It is a continuous function.
- It is a pervasive function.
- It is an integral part of the management process.
- It is a difficult function because it deals with human beings who have their own needs, emotions and aspiration.
- It is concerned with the human resources of an organization.

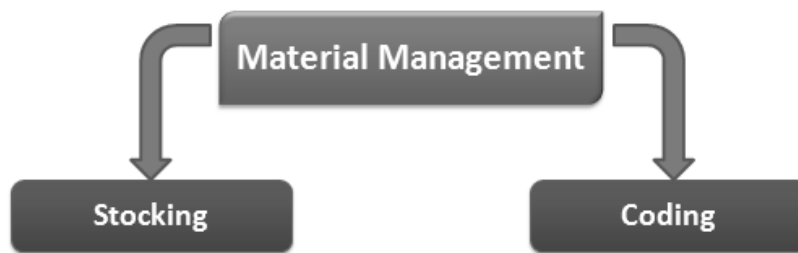
1.2.3.3 Importance of staffing

- (i) Staffing helps to build up a healthy organization in which the job performance and satisfaction of every employee can be high.
- (ii) Staffing injects life into the organization by providing right person for every job. The effectiveness of directing and control functions also depends upon staffing.
- (iii) Employees in the organization are the most valuable asset of an organization. The quality of human assets largely determines the success and growth of the organization.

1.2.4 Material Management

Material Management is a basic function of the business that adds value directly to the product itself. Material Management is the planning, directing, controlling and coordinating the activities concerned with material and inventory requirements from the point of their inception to their introduction into the manufacturing process.

The two important aspects of material management includes:



1.2.5 Stocking

The drug store should have adequate space for storage of drug with proper lighting, ventilation and temperature controls. Special locked storage space provided to meet the legal requirements for storage of narcotics, alcohol and prescribed drugs. The drugs are stored in such a way that they should not be damage due to high temperature. It is a fact that more than 70% of the capital of an enterprise is invested in stores.

1.2.5.1 Objectives of stocking

- (a) Easy location of the items in store.
- (b) Proper identification of items.

- (c) Speedy issue of materials
- (d) Efficient utilization of space.
- (e) Reduction in needs of materials handling equipment.

1.2.5.2 Functions of stocking

- (a) Receiving, handling and speedy issue of material.
- (b) Custodian of goods in store against damage and pilferage.
- (c) To establish regular supply of materials.
- (d) Physical stocking and its checking.
- (e) Efficient utilization of store space.
- (f) To provide service to the organization in most economic way.
- (g) Proper identification and easy location of items.

1.2.6 Arrangements of Drugs in Drug Store

The drugs may be arranged in the following manner:

1.2.6.1 According to manufacturer

The drugs are arranged in a drug store, manufacturer-wise for example, the drug manufactured by Glaxo (India) Ltd. are place in one cup-board and so on.

1.2.6.2 According to pharmacological action

The drugs may be arranged in order of their pharmacological action for example, all analgesics drugs are placed in one cupboard. All multivitamin preparations are kept in another cupboard and so on.

1.2.6.3 Alphabetical order

The drugs may also be arranged alphabetically. The drugs starting with letter "A" are placed in one row of the cupboard. Similarly with other drugs based on their first alphabet.

1.2.6.4 As per old stock and date of expiry

Drugs are stored in such a way that the older stock must be sold first, so that the old stock is stored in front row and the fresh stock is stored on the backside.

1.2.6.5 Location of stores for stocking

The location of stores in an enterprise should be at a place where handling, transportation and movement of the material is at a minimum level. If there is

only single plant or many plants situated at the same area, then it is profitable to have one centralized store to serve all production operations.

The following are some of the advantages and disadvantages of centralized storing-

Advantages

- (a) Economy in investments.
- (b) Reduction in incidental expenses.
- (c) Less storage of space.
- (d) Less manpower required, due to which reduction in administrative costs.
- (e) More bargaining power due to buying in bulk.

Disadvantages

- (a) More materials handling operations.
- (b) The chances of delay are likely to be more.
- (c) More exposed to loss due to natural calamities like fire, rain, dust etc.

1.2.7 Coding or Codification

It is the process of assigning a code number or code symbol to a particular material for easy identification. Usually manufacturers, distributors and wholesalers have large merchandise in the stores. It is difficult to locate the items in the store unless some system is evolved to store them. There should be place for everything and it should be place at their right place. Therefore code numbers are allocated to various items to facilitate easy identification.

Advantages of codification

- (a) It helps in easy identification of items.
- (b) It helps in grouping the similar items together.
- (c) The ambiguity in description of the materials can be avoided.
- (d) The detailed description of the materials is minimized.
- (e) It helps in avoiding duplication of items.
- (f) It helps in physical counting.
- (g) It helps in inspection of the materials.
- (h) The coding helps in maintaining the secrecy of the items.

1.2.7.1 Methods of codification

The various methods employed for codification includes

1.2.7.1.1 *Alphabetical order method*

1.2.7.1.2 *Mnemonic method*

1.2.7.1.3 *Numerical method*

- (a) Decimal system
- (b) Block system

1.2.7.1.4 *Combination method or alphanumerical method*

1.2.7.1.5 *Location coding*

- (a) Fixed location
- (b) Random location
- (c) Zonal location

1.2.7.1.1 *Alphabetical order method:* This method is also known as “Letter Code” system. In this system all items are on the code number alphabetically for example

Code “C” represents capsules

Code “T” represents tablets

1.2.7.1.2 *Mnemonic method:* In this method, coding letters assigned to each items so that they can be very easily identified for example “APC” represents aspirin, paracetamol and caffeine. The main disadvantage is that the items cannot be identified without refers *code index book*.

1.2.7.1.3 *Numerical method:* This method is also known as ‘*sequence system method*’. Under this method separate numbers are assigned to different classification of store items. The method has the following sub-systems-

(a) **Block system**

In this method the numbers are reserved for specified items. Example let the number 10-50 is allotted to various types of tablets.

10.1, 10.2, 10.3, 10.4, 10.5 represents antipyretic, analgesic, anti-inflammatory, decongestants and cold remedies respectively.

(b) **Decimal system**

In this system, the numbers are assigned in such a way that each digit represents the separate name under same heading. example-

Let the code for tablet is 10, then 10.1 (Paracetamol- antipyretic), 10.2 (Analgin-analgesic).

1.2.7.1.4 Combination method: In this method both mnemonic and numerical methods are combined to assign a code to different items of the store example Code number “CPC” is allotted from chloramphenicol capsules.

Code number “PAT 11” is allocated to paracetamol with analgin tablets.

This method is used when store items are quite large.

1.2.7.1.5 Locating coding: In a large organization, there are a large number of stores. The store rooms are divided in blocks and each block is identified by lateral block letter and longitudinal block letter. The location of items can be identified from ware-house number, block number, row number, rack number and shelf number etc.

Location of any item inside the store rooms can also be done in the following manner-

(a) Fixed location

In this method each and every group of items is allotted a fixed place inside the store according to either-

- (i) Supplier wise
- (ii) Item wise
- (iii) According to the utility of the item.

(b) Random location

This is most widely used method in almost all kinds of retail shops but each group items are stored, in a particular shelf for its easy location.

(c) Zonal location

According to this system, available space is divided into different zones and each zone is allotted to different kinds of items. The zones can be named as-

- (i) Bulk Zone
- (ii) Reserve Stock Zone
- (iii) Spare part Zone
- (iv) Consumable Item zone

1.2.8 Space Layout

Plant layout is a method of allocating machines and equipments, various production processes and other necessary services involved in transformation process of a product with the available space of the factory, so as to perform

various operations in the most efficient and convenient manner providing output of high quality and minimum cost.

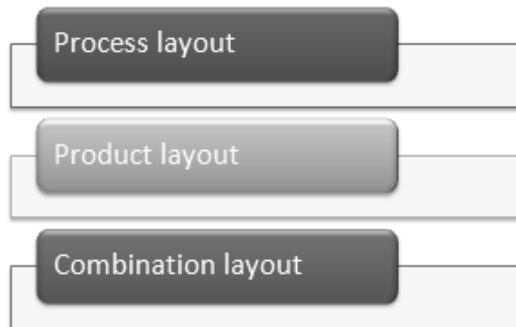
Planning the layout of a plant is a continuous process as there are always chances of making improvements over the existing arrangements.

1.2.8.1 Objectives of an ideal plant layout

- (i) Material handling and transportation is minimized and efficiently controlled.
- (ii) Work stations are designed suitable and properly.
- (iii) Suitable spaces are allocated to production centers and service centers.
- (iv) The movement made by workers is minimized.
- (v) Waiting time of the semi furnished product is minimized.
- (vi) There are improved work methods and reduced production cycle means or times.
- (vii) There is increased flexibility for changes in product design and for the future expansions.
- (viii) A good layout permits materials to move through the plant at the desired speed with the lower cost.

1.2.8.2 Types of layout

There are mainly following types of layout-



1.2.8.2.1 Process layout

It is also known as functional layout and is characterized by keeping similar machines or similar operation at one location. The arrangement of machines of a particular class doing a particular type of work or process as a separate department e.g. cutting machines may be placed under cutting department.

Advantages

- (i) Better machine utilization.
- (ii) Greater flexibility
- (iii) Better supervision which ultimately leads to better production.
- (iv) Less number of machines is needed involving reduced capital.

Disadvantages

- Functional Layout type may not be possible in the pharmaceutical and chemical industries, because a number of unit operations should be performed in sequence.

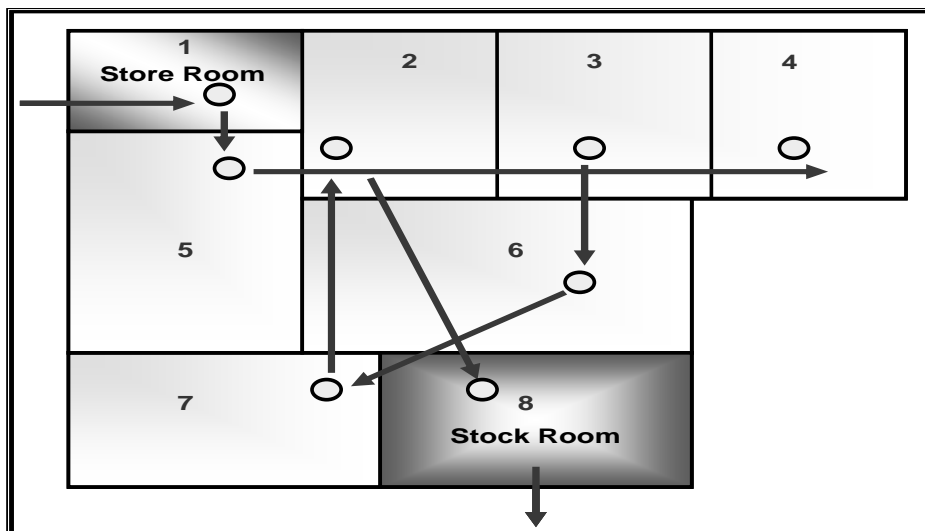


Fig. 1.3 Typical set up for Process Layout

1.2.8.2.2 Product layout

It is also called as *straight line layout* and according to the product manufactured. This set up of product layout is standardized in beginning. The product can be manufactured in large quantity by repetitive operation.

Advantages

- (i) Less space requirements for the same volume of production.
- (ii) Less in-process inventory.
- (iii) Smooth and continuous work flow.

- (iv) Processing of work is quick and smooth.
- (v) Cost of material handling can be reduced by using conveyors.
- (vi) Manufacturing time is reduced and manufacturing cycle can be speeded up.
- (vii) Floor space can be properly utilized.

This type of layout is **more suitable for the Pharmaceutical Industries.**

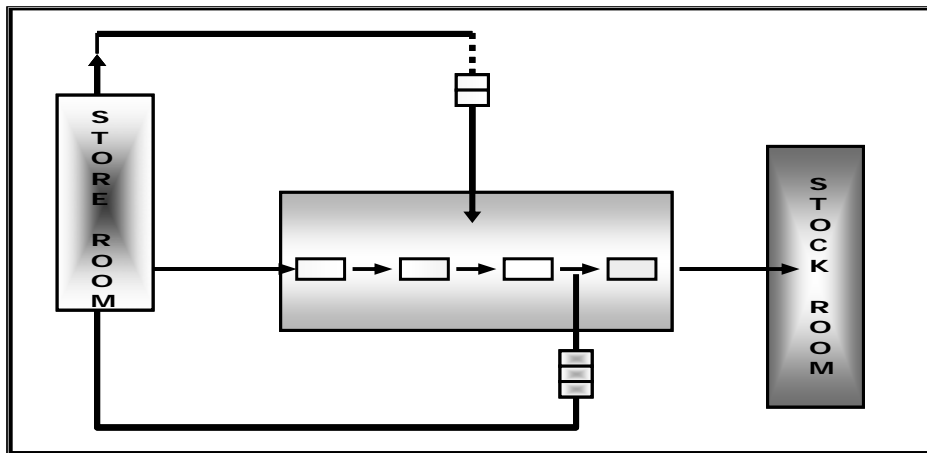


Fig. 1.4 Typical set up for Product layout

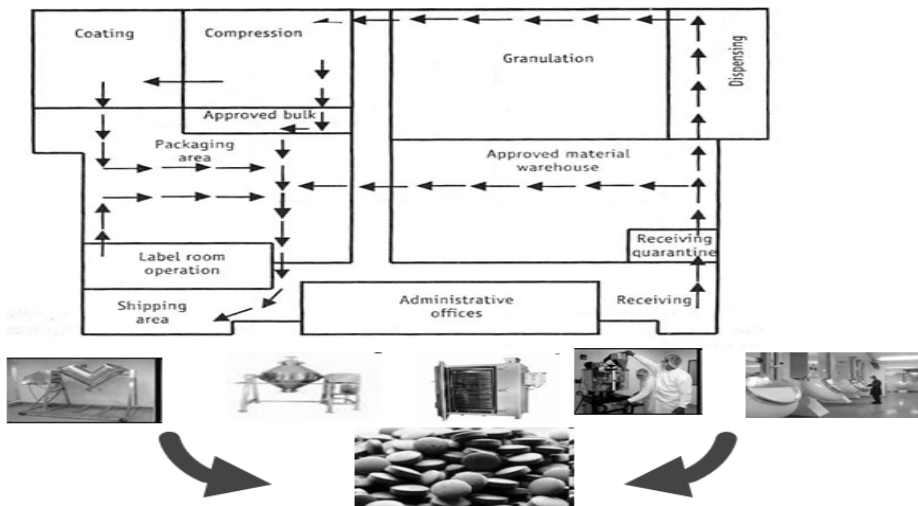


Fig. 1.5 Typical set up for Product layout for Tableting Process (Mixing, Granulation, Drying, Tablet Compression and Coating)

1.2.8.2.3 Combination layout

A combination of process and product layout combines the advantages of both types of layout. The layout should be efficient by keeping material handling at a minimum level. Suitable layout planning is required to keep the cost of product minimum.

1.2.9 Selection of Site

A plant is a place where men, materials and equipment are brought together for manufacturing procedures. The basic requirement for setting up a pharmaceutical industry is the availability of appropriate site.

1.2.9.1 Importance of plant location or site

The selection of appropriate location is important due to the following reasons-

1. Location of plant partially determines operating and capital cost. It determines the nature of investment costs to be incurred and also the levels of many operating costs.
2. Location fixes some of the physical factors of the overall plant design example heating and ventilation requirements, storage capacity of raw material taking into consideration their local availability.
3. Each prospective location implies a new allocation of capacity to respective market area.
4. Government some-times play an important role in the choice of the location keeping in view the national benefits.

1.2.10 Plant Location-Factors Influencing

The selection of a location for the construction of a pharmaceutical plant is a vital decision to be taken, because it determines the balancing of investment and profit. Hence the location of the plant has a strong influence on the success of an industrial venture. Primarily the plant should be located where the minimum cost of production and distribution can be achieved. But other factors such as room for expansion and general living conditions are also important. These factors may be described as follows:

1. Fundamental (Primary) Factors
2. Derived (Secondary factors)

1.2.10.1 Fundamental or primary factors



1.2.10.1.1 Raw materials: The availability of raw materials and cost of its transportation are the major determinants. Pharmaceutical industry uses the following types of raw materials: crude drugs, inorganic and organic chemicals etc. It would be economical to locate the plant nearer to the source of raw materials particularly when they are consumed in large volumes. If the raw materials are not readily available or a dangerous chemical, the freight charges and risk of dangers increase enormously. If raw materials are stable, other factors gain more importance over this factor.

1.2.10.1.2 Market of products: Market exercises a strong influence on the establishment of industries. When market is regional, the industry is located nearer to the market. The bulk drug industry is located in a place where drug formulation industries are located, since bulk drugs are the feed for the formulations and buyers are found nearby.

1.2.10.1.3 Energy availability: Fuel and power are the energy sources, which exert the same kind of influence as the raw materials. Now a days, electricity and diesel engines are developed and available widely. In many cases, plant produces power on their own for the smooth functioning of the industry. Therefore, it is possible to locate the industry remote to the power generation plants.

1.2.10.1.4 Transportation facility: Transportation is the lifeline of modern industry. Transport facilities are needed for bringing raw materials and sending the finished products. An industry tends to be localized at places, which have a

developed means of transport such as railway, road and seaport. These facilities are normally available in metropolitan cities. Hence most of the industries are either located in such cities or in its vicinity.

1.2.10.1.5 Labour supply: Low wages and abundant labour help in localization of certain industries. However, pharmaceuticals and chemical plants require skilled labour, who are better paid and often highly mobile. Therefore, industries can be located away from the areas of labour concentration. Consideration should be given to prevailing pay rates, restrictions on number of hours per week, competing industries etc.

1.2.10.2 Derived (secondary) factors



1.2.10.2.1 Climate and soil: Climate and soil is very important for industries depending on agriculture. In pharmaceutical industry, many operations are carried out in air-conditioned rooms, in dust free environments and under strict control and regulations depending upon the nature of formulation. Industries producing antibiotics are normally located in a place wherein the microbial contamination in environment is low and the ambient temperatures throughout the year are cool.

1.2.10.2.2 Government concessions: Government has been providing subsidies and tax concessions for the industries located in certain notified areas. These areas have been declared as industrially backward and the government offers incentives, namely cheaper power, tax concession etc.

1.2.10.2.3 Water supply: The processing industries use larger quantities of water for cooling, washing and steam generation and also as a raw material (liquid orals). The plant therefore must be located in a place where a dependable supply of water is available.

1.2.10.2.4 Waste disposal: In recent years, many legal restrictions have been imposed on the methods for disposing of waste materials from the processing industries. The site selected for a plant should have adequate capacity and facilities for correct waste disposal. Attention should also be given to potential requirements for additional waste treatment facilities.

1.2.10.2.5 Site characteristics: The topography of the land and soil structure must be considered, since either both may have a pronounced effect on construction costs. The cost of land, local building construction costs and living conditions are important. Future changes for expanding the plant facilities make it desirable or necessary.

1.2.10.2.6 Flood and fire protection: Many industries are located along large bodies of water and there are risks of flood or hurricane damage. Before choosing a plant site, the regional history of natural events of this kind should be examined. In case of major fire, assistance from the outside departments should be easily available.

1.2.10.2.7 Community factors: The character and facilities of a community can have quite an effect on the location of the plant. Cultural facilities of the community are important for sound growth. Churches, temples, libraries, schools, theaters and other similar groups, if active and dynamic, do much to make a community progressive.

1.2.11 Special provisions of Factory Premises: location

It is important to recognize that the pharmaceutical industry has some special requirement that need to be interpreted. The factory shall be located in a sanitary place remote from filthy surroundings. The factory shall be situated in place which:

- (a) shall not be adjacent to an open sewage, drain or public lavatories.
- (b) Shall not be adjacent to a factory, which produces disagreeable or obnoxious odours or fumes.
- (c) Shall not be adjacent to a factory, which emits large quantities of soot, dust or smoke.

The factory shall not constitute undue danger to adjacent life and property. State laws and other related laws should be consulted. It becomes necessary for the entrepreneur to acquaint himself with all the legal controls, which are existing like Indian Factories Act, Drugs and Cosmetics Act and Rules etc. Checklist provides a useful means of evaluating a site location and other factors associated with its selection.

1.2.12 Use of Computers in Pharmacy

The computer has become one of a popular tool in all areas of science and technology. Right now computers and pharmacy go hand in hand. Today computers can provide the exchange of health information and services across geographic, time and social boundaries. Computers have revolutionized the way education is handled in the today's world. In medical education, computers are particularly useful because there is such a need for learning and presenting large amounts of data, getting and comparing accurate study and test results, and effectively monitoring patients.

With the proliferation of the Internet and the developments in computer technology and manufacturing, the ratio of price to performance of computers continues to decrease. This has resulted in the development of number of computer applications. The field of pharmacy has immensely benefited by the use of computer and will continue to benefit as the pharmacist's gain more familiarity with computers.

The complete field of pharmacy requires computers. Some of the important areas where computers are useful are *new drug discovery, drug design, analysis, manufacturing of drugs and hospital pharmacy*. Other than these, computers helps pharmacist collaborate with other professionals, which is very essential in today's research work. It also provides solutions for time consuming manual task.

Various *hardware and softwares have been developed without which drug discovery, designing, manufacturing and analyzing* would become virtually impossible. Further development is still in progress which will make pharmacist's job easier. The more important fact is that they will enable us to discover new drugs for the complete care of dangerous of diseases like AIDS, cancer etc. and reduce the cost of production of drugs for diseases which are easily cured.

Computers are also useful for *hospital pharmacist and in telemedicine*. A lot has been done and a still has to be done for improving the computer facilities for pharmacist.

1.2.12.1 Computer aided design of drugs

A further refinement of new drug design and production was provided by the process of computer-aided design (CAD). With the availability of powerful computers and sophisticated graphics software, it is possible for the medicinal chemist to design new molecules and evaluate their effectiveness.

1.2.12.2 Drug information services

Pharmaceutical companies are responsible for providing updated, relevant information on the efficacy, safety and quality of drugs to medical professionals and finally to patients. To fulfill this responsibility, they developed a drug information database system to manage various information generated during development of new products and after launch of the products. This system is incorporated into an on-line network system, and can be directly accessed by thousands of people all over the world.

1.2.12.3 Information system in pharmaceutical industries

An **information system** (IS) is any combination of information technology and people's activities using that technology to support operations, management, and decision-making.

Advanced pharmaceutical companies are realizing that the implementation of information management technologies in their operations can greatly enhance their chances for success by reducing their time-to-market and enhancing efficiency in their production runs.

Pharmacy informatics, also referred to as **pharmacoinformatics**, is one of the latest the application of computers to the storage, retrieval and analysis of drug and prescription information.

Pharmacy informaticists work with pharmacy information management systems that help the pharmacist make excellent decisions about patient drug therapies with respect to, medical insurance records, drug interactions, as well as prescription and patient information.

Pharmacy informatics can be thought of as a sub-domain of the larger professional discipline of health informatics. Some definitions of pharmacy informatics reflect this relationship to health informatics. For example, the Health Information Management Systems Society (HIMSS) defines pharmacy informatics as, "the scientific field that focuses on medication-related data and knowledge within the continuum of healthcare systems - including its acquisition, storage, analysis, use and dissemination - in the delivery of optimal medication-related patient care and health outcomes" (HIMSS October 2006).