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UNIT VII

MATERIAL MANAGEMENT

INTRODUCTION:

Materials are an essential resource to achieve the objectives of a health care organization. While about 60 percent of the funds of health sector are consumed to provide manpower, health care being a labour intensive activity, almost 40 per cent of the funds are used up for providing materials. In the absence of materials required for health care activities, the manpower deployed is rendered non-functional. Therefore, it is of great importance that materials of right quality are supplied to the consumers in high quantity at right time and at right place of use.

Definition

Planning and control of the functions supporting the complete cycle (flow) of materials, and the associated flow of information. These functions include (1) identification, (2) cataloging, (3) standardization, (4) need determination, (5) scheduling, (6) procurement, (7) inspection, (8) quality control, (9) packaging, (10) storage, (11) inventory control, (12) distribution, and (13) disposal. Also called materials planning**.**

Material Management is concerned with control of materials in such a manner which ensures maximum return on working control material management is concerned with the location & purchase of needed their storage & movement. It also arranges to keep on account for them .it is also responsible for planning their movement through manufacturing processes, store rooms and distribution channels .

Concepts of material management

For running any industry or business, we need a number of resources. These resources are popularly known as 5 M's of any Industrial activity i.e.

- Men,
- Machines,
- Materials,
- Money and
- Management.

- All these resources which are basic inputs, are important but their relative importance depends upon the particular type of industry and also other environmental factors. Earlier, when many modern machines were not even known, whole activity was around men.

- But now the importance has shifted from men to machines and in the present environment materials are the life blood of any industry or business and for their proper running, materials should be available at proper time in proper quantity at proper place .

Achieving this task of making materials available may not be difficult if they are available in plenty and there are no constraints as regards to cost at which they are arranged.

- In the earlier days when there was not much of competition, cost at which materials were arranged was not a constraint. Producers were able to pass on all the costs to customers and therefore achieving efficiency in managing materials was not a necessary requirement.
- But due to tough competition for most of the Industrial products and limited financial resources, industries have been compelled to find out ways and means of reducing costs if they want to survive in the competitive market.

Basic goals of any industry are survival and earning profits to make an adequate returns on capital employed (investment). The profitability of any organization can be judged by a ratio known as 'Rate of Return on Investment' which is defined as profits earned for unit investment

Rate of Return (ROI) = Profit / Capital Employed (Investment) where ,
Profit = Total Receipt - Total Expenditure and
Capital Employed = Fixed Assets + Current Assets

Different strategies for improving profitability (ROI) may be as under:-

(i) *To increase total receipts :* For this either sales have to be increased or the prices of the products sold have to be increased. Both these alternatives are very difficult to achieve in present competitive market.

(ii) *To Reduce Expenditure :* Majority of the expenditure of any industry is either on men or materials. The relative expenditure on men and materials vary from industry to industry but in most of the industries expenditure on materials is 45% to 70% of total expenditure while expenditure on men will be around 45 to 15% (assuming 15% as miscellaneous expenditures).

- Therefore, two broad areas for reducing expenditure are men and materials. However, reducing expenditure on men is a very difficult task in today's environment of tightly labor laws and strong trade unions. Therefore the other are to be tackled remains reducing expenditure on materials.
- When we talk of expenditure on materials, it is relevant to point out here that there are two types of costs related to materials
    - - cost of materials and
    - - cost on materials
- i.e. there are always some extra expenditure related to materials which is not actual cost of materials. We can very well tackle these extra costs (cost on materials) without affecting the actual level of consumption and may achieve reduction in expenditure.

(iii) *Reduce Investment in Fixed Assets :* As investment has already been made, there is very little scope for reducing expenditure on fixed assets.

(iv) *Reduce Investment in Current Assets :* Current assets consist of mainly working capital and inventory. As a rough estimate, about 40% of current assets are generally tied up in inventories of raw materials, consumables, materials under different stages of production and finished goods. If we could reduce stocks of these different types of inventories. We can very well reduce investments in current assets and improve profitability.

- It is, thus, clear from the foregoing paragraphs that for both survival and for increasing profitability, managing materials plays a very important role and it has been now realized by most of the industries, public as well as private, that 'materials management' function can also be a profit center within the organization because this function has lot of potential for contributing towards profitability of the organization.

Integrated Concept Of Materials Management :

Traditionally, various activities related to managing materials were looked after by various departments. While purchases were generally arranged by top management with the assistance of a Purchase Agent or Purchase Officer, store keeping and stock control was the responsibility of the production head with the assistance of a store keeper or Stores Officer. Apart from these two main activities, distribution of materials (mostly finished goods) was the responsibility of marketing.

After realizing the profitability potential of Materials Management function, when attempts were made to exploit this potential , it was realized that there were many problems in achieving the objectives due to inherent conflicts amongst various departmental objectives. when a purchasing personnel wants to purchase in bulk to get price discounts, inventory of the stores personnel becomes high. Similarly desire of marketing personnel to have adequate stocks of finished goods in order not to loose any opportunity of sale resorts in high inventory.

- The conclusion is that in the traditional set up one person could not be held responsible for all the functions of materials management to achieve overall economy. Therefore necessity of placing all the functions related to materials management e.g. purchasing, stocking, inventory control and distribution under one department headed by an executive of status at par with other departmental heads, was felt.
- Thus evolved the concept of integrated materials management which can be defined as the function which is responsible for the coordination of planning, selecting sources, purchasing, moving, storing and controlling materials in an optimum manner so as to provide a pre-decided service to the customer at a minimum cost.

Objectives Of Materials Management :

- The objectives of integrated materials management can be classified in two categories ;
    - **Primary and**
    - **Secondary**.
- These are discussed below ;

.*1 Primary Objectives :* Following may be identified as primary objectives which are to be achieved.

(a) To purchase the required materials at minimum possible prices by following the prescribed purchase policies and encouraging healthy competition.

(b) To achieve high inventory turnover i.e. to meet materials requirement of the organization by keeping low average stocks so that the capital locked up in materials is turned over a large no of times.

(c) To incur minimum possible expenditure on administrative and other allied activities related to purchase of materials and also to keep the materials in stock till they are finally delivered to the users.

(d) To ensure that continuity of supply of materials to the users is maintained by avoiding out of stock situation.

(e) To supply materials of consistent quality i.e. of quality which meets user specification and is fit for service.

(f) To keep the wage bill of the department low by ensuring proper distribution of work among staff and not employing surplus staff.

(g) To maintain good relationship with the suppliers of materials and also develop new suppliers for the products for which reliable suppliers do not exist.

(h) To ensure training and development of personnel employed in the department so that good industrial relations are maintained.

(i) To maintain proper and up-to-date records of all stores transactions and purchases.

2 .Secondary Objectives :

(a) To assist technical/design department in developing new materials and products which may be more profitable to the organization.

(b) To make economic 'make or buy' decisions.

(c) To ensure standardization of materials

(d) To contribute in the product improvement.

(e) To contribute in the development of inter departmental harmony.

(f) To follow scientific methods of forecasting prices and future consumption of materials.

Elements of material management:

Material management and management is a system having numerous elements. Proper functioning of each of the elements coupled with interdependence of all the sub-systems to achieve the primary objectives are classical characteristics of the material planning and management system. The major sub-system of MP and M system are:

- Demand estimation
- Procurement
- Receipt and inspection
- Storage
- Issue and use
- Maintenance and repair
- Disposal
- Accounting and information system

Procedures and rules for material management:

- Estimation of budgeting for materials
- Indent of materials
- Placing indent with government stores as or local firms (RC)
- Receiving and verification of materials(quality, quantity, breakage, expiry date, spoiled etc.)
- Transportation of materials
- Issuing materials

Planning and Procurement

Introduction

Material management is a scientific technique, concerned with Planning, Organizing and Control of flow of materials, from their initial purchase to destination. It is concerned with planning, organizing and controlling the flow of materials from their initial purchase through internal operations to the service point through distribution. The material management in the health care system is concerned with providing the drugs, supplies and equipment needed by health personnel to deliver health services.. About 40 percent of the funds in the health care system are used up for providing materials. It is of great importance that materials of right quality are supplied to the consumers

Material management integrates all materials functions

- Planning for materials
- Demand estimation
- Purchasing
- Inventory management
- Inbound traffic
- Warehousing and stores
- Incoming quality control

Material Planning

"Material planning is the scientific way of determining the requirements that goes into meeting production needs within the economic investment policies". - Gopalakrishnan & Sunderasan
It is done at all stages and all levels of management. Material planning is based on certain feedback information and reviews.

Aim of material management planning

To get:

- The Right quality
- Right quantity of supplies
- At the Right time
- At the Right place
- For the Right cost

Purpose of material management planning

- To gain economy in purchasing
- To satisfy the demand during period of replenishment
- To carry reserve stock to avoid stock out
- To stabilize fluctuations in consumption
- To provide reasonable level of client services

Objective of material management planning

Primary	Secondary
• Right price • High turnover • Low procurement and storage cost • Continuity of supply • Consistency in quality • Good supplier relations • Development of personnel • Good information system	• Forecasting • Inter-departmental harmony • Product improvement • Standardization • Make or buy decision • New materials and products • Favorable reciprocal relationships

Basic principles of material management Planning

Effective management and supervision ,It depends on managerial functions of:

- Planning
- Organizing
- Staffing
- Directing
- Controlling
- Reporting
- Budgeting
- Sound purchasing methods
- Skillful and hard poised negotiations
- Effective purchase system
- Should be simple
- Must not increase other costs
- Simple inventory control programme

Techniques of Material Planning

- **Bill of Material technique**

- BOM is the simplest technique of materials planning.
- Explosion of bill of materials refers to splitting the requirements for the product to be manufactures in to its basic components. E.g. in health care is drugs manufactured in the pharmacy
- This technique is ideally suited to engineering industries.

- The technique is based on demand forecasts.
- Requirement for various materials are listed with their complete specifications

■ Past Consumption Analysis Technique

- In this technique future projection is made on the basis of the past consumption data, which is analyzed taken in to consideration the past and future plans.
- Statistical tools like mean, median, mode and standard deviation are used in analyzing the past consumption.

Elements of material management Planning

Demand estimation
A large number of items are used in the hospital. The advisory committee for development of surgical instruments, equipment and appliances (1963) identified 3200 items of instruments, equipments and appliances being used in the hospital.

Identify the needed items

- Need for variety reduction-less number of materials, less will be the problems of planning
- Lying down proper specification based on ISI or other standards

Calculate from the trends in Consumption

- Review past the consumption in the past

Review with resource constraints

- Availability of funds

Problems affecting material planning

- Corporate/Govt objectives and plans
- Technology available
- Market demand
- Lead time and rejection rates
- Working capital available
- Nature of inventory required
- Capacity and its utilization of the organization
- Seasonal variations
- Information and data available
- Overall material policy

Procurement

Most organizations have a detailed set of rules and regulations regarding the procedure for ordering for materials. In the Government systems DGHS play a crucial role in purchasing materials of heavy cost.

Objectives of procurement system

- Acquire needed supplies as inexpensively as possible
- Obtain high quality supplies
- Assure prompt and dependable delivery
- Distribute the procurement workload to avoid period of idleness and overwork
- Optimize inventory management through scientific procurement procedures

Procurement cycle

- Review selection
- Determine needed quantities
- Reconcile needs and funds
- Choose procurement method
- Select suppliers
- Specify contract terms
- Monitor order status
- Receipt and inspection

Methods in Procurement Process and Negotiation Strategies

Open tender

- Public bidding, resulting in low prices
- Published in newspapers
- Quotations must be sent in the specific forms that are sold, before the time and date mentioned in the tender form
- Technical bid
- Financial bid

Restricted or limited tender

From limited suppliers (about 10)
Lead-time is reduced
Better quality

Negotiated procurement

Buyer approaches selected potential Suppliers and bargain directly
Used in long time supply contracts

Direct procurement

Purchased from single supplier, at his quoted price
Prices may be high
Reserved for proprietary materials, or low priced, small quantity and emergency purchases

Rate contract

Firms are asked to supply stores at specified Rates during the period covered by the Contract

Spot purchase

It is done by a committee, which includes an officer from stores, accounts and purchasing departments

Risk purchase

If supplier fails, the item is purchased from other agencies and the difference in cost is recovered from the first supplier

Many Suppliers Strategy

Many sources per item
Adversarial relationship
Short-term
Little openness
Negotiated, sporadic PO's
High prices
Infrequent, large lots
Delivery to receiving dock

Few Suppliers Strategy

1 or few sources per item
Partnership (JIT)
Long-term, stable
On-site audits and visits
Exclusive contracts
Low prices (large orders)
Frequent, small lots
Delivery to point of use

Contractual services by Directorate General of Supplies and Disposals for Government Institutions

Fixed quantity contract: supply firms are called upon to offer to supply a definite quantity of stores by a specified date. Such contracts are binding both parties

Running Contract: these contacts are for supply of an approximate quantity of stores at a specified price during a certain period of time.

Rate contract: most common contracts in health care institutions, in which firms are asked to supply stores at specific rates during the period covered by the contract. No fixed quantity is mentioned. This system of offers maximum flexibility in ordering specified quantity of materials at frequent intervals.

Points to remember while purchasing

Proper specification
Invite quotations from reputed firms
Comparison of offers based on basic price, freight and insurance, taxes and levies
Quantity and payment discounts
Payment terms
Delivery period, guarantee
Vendor reputation (reliability, technical capabilities, Convenience, Availability, after-sales service, sales assistance)
Short listing for better negotiation terms
Seek order acknowledgement

Procurement of equipments

Points to be noted before purchase of an equipment:

- Latest technology

-Availability of maintenance and repair facility, with minimum down time
-Post warranty repair at reasonable cost
-Upgradeability
- Reputed manufacturer
- Availability of consumables
-Low operating costs
-Installation
-Proper installation as per guidelines

Storage

- Store must be of adequate space
-Materials must be stored in an appropriate place in a correct way
- Group wise and alphabetical arrangement helps in identification and retrieval

First-in, first-out principle to be followed

- Monitor expiry date
- Follow two bin or double shelf system, to avoid
-Stock outs
- Reserve bin should contain stock that will cover
- lead time and a small safety stock

Issue and use

Can be centralized or decentralized

ABC analysis

ABC analysis is the analysis of the store items cost criteria. It is a simple approach, which avoids being penny wise and pound foolish. Of the various techniques, ABC classification is the most important technique. The cost of each item is multiplied by the number used in a given period and then these items are tabulated in descending numerical value order. It will be seen that first 10% of items approximately account for 70%, the next 20% for 20% of value and the last 70% account for 10% of value.

It has been seen that a large number of items consume only a small percentage of resources and vice- versa. A – Items represent the high cost centre, B items represent the immediate cost centres, and C- items represent low cost centres. A very close control is exercised over A items while less stringent control is adequate for those in the category B, and less attention for category C.

By concentrating on controlling A- items, and to a lesser degree on B items, it will be possible to control the inventory quiet effectively both in the way of cost control and lessening the risk of ‘stock out’. Since A items are of the highest value and are required in large numbers they could be purchased more frequently and the others, B & C items less frequently. In so far as inventory control is concerned the following

guidelines will help in keeping the system optimum (i.e. Healthy balance between financial constraints and purchase of required quantity of materials)

A- Items: on

1. Tight controls
2. Rigid estimates of requirements
3. Strict and close watch (monitoring)
4. Safety stocks should be low
5. Management of items should be done at top management level.

B- Items

1. Moderate control
2. Purchase based on rigid requirements
3. Reasonably strict watch and control
4. Safety stocks moderate
5. Management be done at middle level

C- Items

1. Ordinary control measure
2. Purchase based on usage estimates
3. Controls exercises by store keeper.
4. Safety stocks high
5. Management be done at lower levels.

Rate of consumption:

Close study of each item from the point of view of movement of store or consumption rate is a strong tool for proper inventory control. The items can be classified into:

1. Fast moving
2. Slow moving
3. Non- moving
4. Obsolete

An understanding of the movement of items helps to keep proper levels of inventories by deciding a rational policy or reordering. This method is based on the fact that some stock items have a much higher annual usage value than others. This after doing a cost analysis, stock items are separated into three classes with the following characteristics.

Class	**Number of items**	**Rupee value in items**
A	10% of total items	70%
B	20% of total items	20%
C	70% of total items	10%

Steps in computing A-B-C analysis: procedure of A-B-C analysis

- First we are trying to prepare a list of items and calculate their annual usage in rupees. This can be obtained by multiplying the quantity (number of units) of the item consumed in one year by its unit price.
- Arranging all these items in the descending order of their individual dosage in rupees. That means the first item in the list will now show the maximum annual usage in rupees, the second item the second maximum, the third item the third maximum and so on. After having done this the total of annual usage in rupees is put at the bottom of the list.
- Those items which together form about 70% of the total annual usage may be total annual usage may be categorized as A items. Similarly. Items which contribute the next 20 to 25 % of the aggregate are listed as B items. The rest which contributes 5 to 10% of the total percentage of annual usage are called C items.
- Placing of the orders on the basis of this classification.

Example: The company has 10 items mentioned in the table .

Table: 1 A-B-C analysis usage in rupees

Items	**Annual usage units**	**Unit cost in rupees**	**Annual usage Rs: (2)×(3)**	**Ranking**
1	2	3	4	5
101	20,000	0.25	5000	4
102	30,000	0.20	6000	3
103	10,000	0.10	1000	6
104	500	0.30	150	9
105	50,000	0.20	10000	2
106	8000	.05	400	8
107	60,000	0.40	24000	1
108	700	1.00	700	7
109	9000	0.50	4500	5
110	50	2.00	100	10
Total			Rs: 51,850	

Table :1 shows a representative ABC analysis where 10 items have been studied and annual usage extended by unit cost to get annual usage in rupees.

Table: 2 A-B-C ranking

Ranking	**Item**	**Annual usage Rs.**	**Cumulative annual usage Rs.**	**Cumulative percentage**	**Category**
1	107	24000	24000	46.28	A

2	105	10000	34000	65.57	A
3	102	6000	40000	77.14	B
4	101	5000	45000	86.78	B
5	109	4500	49500	95.47	C
6	103	1000	50500	97.39	C
7	108	700	51200	98.14	C
8	106	400	51600	99.51	C
9	104	150	51750	99.81	C
10	110	100	51850	100.00	C

Table 2 shows the ranking and assignment of A, B and C categories of items.

Table 3: Summary of A-B-C analysis:

Class	Item	% of items	Rs: (per group)	Cumulative percentage of Rs.
A	107,105	20	34000	65.57
B	102,101	20	11000	21.21
C	109,103,104 106,108,110	60	6850	13.22

Table 3 shows a summary ABC analysis showing that 20% of the items represent 65.57 % of annual usage 20 percent of the item represent 21.21% of annual usage and 60% of the items represent only 13.22 % of annual usage.

A items are ordered more frequently and I small quantities (i.e. few weeks requirements) while C items are ordered just once or twice a year to obtain the entire year's requirement. Without A-B C analysis, the ordering policy of an undertaking may be to order all items once a quarter and position would be somewhat represented by: TABLE 4

Table 4:

Category	No. of orders per year	Annual requirement in Rs:	Quantity ordered each time in rupees	Average inventory in Rs.
A	4	40,000	10000	5000
B	4	4000	1000	500

C	4	400	100	50
TOTAL				5550

The average total inventory in the above case is 5550 and adding 20% carrying cost the total inventory cost works out to be 5550+ 1110= Rs: 6660. Now , if A-B-C analysis is applied the ordering policy would be different , thought the total number of orders placed during the year is the same as before.

Category	**No. of orders per year**	**Annual requirement in Rs:**	**Quantity ordered each time in rupees**	**Average inventory in Rs.**
A	10	40,000	4000	2000
B	5	4000	800	400
C	1	400	400	200
TOTAL				2600

Average total inventory is now Rs: 2600 and adding 20% inventory carrying cost the total inventory cost works out to be 2600+ 520= 3120, which is 3540 lower than the corresponding cost in the first instance.

VED ANALYSIS

ABC analysis does not tell anything about the criticality of the items. This is an important variant in patient care services. Based on the estimation of the time length for which non availability can be tolerated, there are three categories. The stores when subjected to analysis based on their criticality can be classified into vital, essential and desirable stores. This analysis is termed as VED analysis.

1. **Vital**: items without which treatment comes to standstill: i.e. non- availability can not be tolerated.
2. **Essential**: items whose non availability can be tolerated for 2-3 days, because similar or alternative items are available.
3. **Desirable:** items whose non availability can be tolerated for a long period. Although the proportion of vital, essential and desirable items varies from hospital to hospital depending on the type and quantity of workload, on an average vital items are 10%, essential items are 40% and desirable items make 50% of total items available.

Although not included in scientific VED analysis, in some public organizations which are static or inefficiently managed, there is a peculiar category of ‘U’ items which can be grouped as unnecessary. These unnecessary items get purchased due to the following reasons.

a) Thoughtless continuation of previous purchase.

b) Indifferent attitude towards hospital formulary

c) Fear of change

d) Poor supervision and control

e) Unfair practice due to vested interest.

The vital items are stocked in abundance; essential items are stocked in medium amounts, and desirable items we stocked in small amounts. By stocking the items in order of priority, vital and essential items are always in stock which means a minimum disruption in the services offered to the people.

It should be realized that vital- V items and A items are not the same. All the vital items are not expensive and all the expensive items are not vital. Domestic examples of salt and matchbox proves that though these items are vital, they are not expensive, similarly microwave oven and air conditioning unit are expensive, but they are not essential.

It is possible to conduct a two dimensional analysis taking into consideration cost on one hand , i.e. A,B,C categories, and critically VED on the other. Findings of ABC and VED analysis can be coupled and further grouping can be done to evolve a priority system of management of stores:

Coupling matrix model

	Cat I	**Cat II**	**Cat III**
	V	**E**	**D**
A	Av	Ae	Ad
B	Bv	Be	Bd
C	Cv	Ce	Cd

An example for the coupling matrix model for equipment between criticality and cost

	V	**E**	**D**
H	Defibrillator 1	X-ray machine 2	Air- curtains 3
M	Ventilator 4	Electric cautery 5	Ultrasonic wash machine 6
L	Oxygen regulator 7	Patient trolley 8	Electronic BP machine 9

NB: 1-9 is cell no **Matrix module: criticality Vs cost**

- Cell 1 contains vital and high cost items like defibrillator. It must be noted that a material manager has to comprehensively supervise category 1 items since an item may be a low cost one but critical for patient care. (oxygen regulator)
- Category I items: these items are the most important ones and require control by the administrator himself.
- Category II items: these items are of intermediate importance and should be under control of the officer in charge of the stores.
- Category III items: these items are of least importance which can be left under the control of the store keeper.
- The grouping will essentially depend upon the strategy of management and the environment of functioning. However these simple techniques can be effective in material management system.

- Items with high criticality (V), but required in small quantity (A) should receive highest priority. Items with low criticality (D) and which are required in big quantity should receive least priority.

PLANNING EQUIPMENTS AND SUPPLIES FOR NURSING CARE IN HOSPITAL

INTRODUCTION

Hospital supplies and equipments are dealt with under material management. Supplies are those items that are used up or consumed; hence the term consumable is used for supplies. The supplies in hospital include drugs, surgical goods (disposables, glass wares), chemicals, antiseptics, food materials, stationeries, the linen supply etc. The term equipment is used for more permanent type of article and may be classified as fixed and movables. Fixed equipment is not a structure of the building, but it is attached to the walls or floors (egg; steriliser,) Movable equipment includes furniture, instruments etc.

PURCHASE OF SUPPLIES AND EQUIPMENT

The purchase of supplies and equipments in a hospital is carried out through;

1. General store
2. Dietary department and
3. Pharmacy department

When planning for the purchase of articles , budgeting is done not only for the actual price of articles but also for the additional costs that are involved such as ;

- Transport charges (local delivery reduce the transport charge)
- Incidental costs
- Cost of chemicals and other consumable to be used with the equipment (eg; ECG paper for an ECG machine)
- Operating cost (hiring a technician)
- Cost of maintenance service; 10-20% of hospital equipment may remain idle if serving is not done periodically.
- Cost of technology obsolesces: when a better quality appears in market there is tendency to discard the old model.
- Replacement cost of equipment

Selection of article- while buying articles it has to meet the standards. Indian Standards Institution is the national agency set up to bring standardisation of articles in India. Articles that meet the criteria specified by the Indian Standard Institution will be marked by ISI markings. The articles bought should provide safety to the patient and personnel. Faulty instruments and equipments cause not only inconvenience in the patient care, but also it may cause the loss of life.

Purchasing article:

- The material used for any equipment should be durable, non-corroding, non toxic and safe for use.
- Should have standard shapes and dimensions to fit into various situations
- Reparability and spare part availability of the article
- Interchangability of the article

- All surgical instruments used in a hospital should be sterilisable and they should stand the tests for leakage , hydraulic pressure tests for bursting etc
- Should have accuracy in measurements
- Should have ease of operation

The central supply service

Most hospitals have a central department where equipments and supplies are stored and from which they are distributed to the units. The type of materials that is kept in the central supply room varies from hospital to hospital. In some hospital the central supply room deals with only the sterile supplies and ward trays. In other hospitals all types of equipment such as oxygen, suction, ward trays, catheters, syringes etc are stored here.

Linen supply: Methods of handling linen supply include;

a) Departmentalised system: Here the supply of linen for each department of the hospital is marked for that department. The head of the department is responsible for making a linen standard for his own department.

b) Centralised linen supply: Under centralised system, linen is issued on exchange basis, that is clean linen is exchanged for soiled linen.

FACTORS TO BE CONSIDERED

1. Type of service provided by the hospital: a maternity hospital requires more equipment related to gynaecologic procedures than a cardiac hospital.
2. Age of patients: children need different type and amount of equipments than adults.
3. Sex- men and women sometime require different type of equipment.
4. Degree and type of illness- neurologic patients sometimes require more bedsides, rubber mattress and linen than patients with other type of illness.
5. Cost of items- cost of items will limit the purchase of number of equipment.

GENERAL UTILITY SERVICES IN THE HOSPITAL

1. **Electric supply and installations**

A hospital must have a steady electrical supply at a stable voltage. Voltage fluctuations play havoc with sophisticated electronic equipment, endoscope, sterilisers, X-ray equipments etc. While planning hospital departments, provision should be made for voltage stabilisation in areas with heavy concentration of electrical and electronic equipment. This is preferred over using voltage stabilisers with individual equipment. There should be an emergency generator capable of supplying power to all emergency areas of the hospital. This generator should be of right capacity and kept in working order by periodic test runs.

2. Water supply

Since safe water supply is not always assured, hospitals must have their own purification system. Also there should be plumbing system.

3. Disposal of waste –liquids and solids.

Disposal of waste both solid and liquid is a totally neglected area. A hospital incinarator good for the waste management.

4. Refrigeration, air conditioning, ventilation and environment control.

Air conditioning is required for protection of sophisticated electronic equipment, X ray, machines etc.

5. Transport

Lifts are needed for vertical transport. There should be separate lifts for patients, visitors, staff and supply. Patients lift should accommodate a standard hospital bed. Sides of the lift must be protected to prevent damage by trolleys. Lift surfaces and flooring should be capable of easy cleaning and disinfection. Ventilation, communication and emergency escape system should be provided on all lifts. As for horizontal transport also trolleys and ramps with gentle gradient are useful.

6. Supply of medical gases , compressed air, hot water, vacuum suction and gas plants

Piped supply of medical gases , compressed air, vacuum suction , hot water, steam, necessitates thoughtful planning at all stages to consider problems of –

- Easy uninterrupted safe supply
- Fire and explosion hazards
- Easy of servicing and maintenance without disrupting hospital services.

7. Laundry- A hospital laundry has 2 separate areas, with provision for decontamination and sterilising of soiled linen.
8. Fire hazard- there should be consideration of ventilation, exhaust systems and adequate earthing of all electrical installation.
9. Communication- public telephone and internal telephones are required in each hospital.
10. Repairs workshop

There should be provision for repair and maintenance of necessary equipments used in the hospital .

MATERIALS USED IN HOSPITALS

Hospital material medical side	**Hospital material management side**
• Perfusion materials • Surgical disposables • Instruments • Drugs, medicine, oxygen, linen • Biomedical equipment • Disinfecting items • Computers, telephone and fax • Food and beverage materials • Anaesthetic equipment • Electro medical equipment • Glass ware, dental machines • Surgical dressing utensils • Artificial limbs ,bandages, cots for patient, furniture • Engineering items and many others	• Computer, fax, telephone, stationary items • Public address items overhead projector • Audiovisual systems

ESSENTIAL EQUIPMENTS FOR A 50 BEDDED DISTRICT HOSPITAL (WHO)

1) Scope of services

- Essential clinical services- medicine, surgery, paediatrics., OBG, and acute psychiatry (when necessary)
- Optional clinical services – oral surgery, orthopaedic surgery, otolaryngology, neurology and psychiatry.
- Essential clinical support- anaesthesia, radiology and clinical laboratory
- Optional clinical support services- pathology and rehabilitation including physiotherapy.

2) Essential medical equipment

- Diagnostic imaging equipment –it include x-ray and ultrasound equipment. X-ray equipment can be stationary in one room or mobile
- laboratory equipment –
    - microscope
    - blood counter
    - analytical balance
    - calorimeter(spectrophotometer)
    - Centrifuge – a small centrifuge that can accommodate six 15ml tubes should be available.
    - Water bath – used for stabilising temperature at 25, 37, 42, or 56degree Celsius.
    - Incubator/oven- a small hot air oven to carry out standard cultivations and sensitisations.
- Refrigerator – an ordinary household refrigerator with a freezer unit, for storing preparations, vaccines, blood etc.
- istillation and purification apparatus - it should be made of metal that resists acid, and alkali and should be free standing.

3) Electrical medical equipment.

- Portable electrocardiograph
- Defibrillator(external)
- Portable anaesthetic unit – 2 small aesthetic units should be obtained, complete with a range of masks.
- Respirator – it should be applicable for prolonged administration during post operative care.
- Dental chair unit- a complete unit should be available to carry out standard dental operations.
- Suction pump –one portable and one other suction pump are required.
- Operating theatre lamp- one main lamp with at least 8 shadows lamp and an auxiliary of 4 lamp units.
- Delivery table- it should be standard and manually operated.
- Diathermy unit – a standard coagulating unit which is operated by hand or foot switch, with variable poor control.

4) Other equipment

- autoclave – for general stabilisation
- Small sterilisers- for specific services- eg. Stabiliser
- cold chain and other preventive medical equipment
- ambulance

5) Small , inexpensive equipment and instruments

- Equipment and instrument, such as BP apparatus, oxygen manifolds, stethoscope, diagnostic sets and spotlights.

Inventory control

It means stocking adequate number and kind of stores, so that the materials are available whenever required and wherever required. Scientific inventory control results in optimal balance. This has to be done at an optimum outlay of financial and human resources. High inventory level leads to high cost of inventories by:

a. Locking the finance
b. Large storage space
c. Large handling and administration charges
d. Obsolescence
e. Spoilage etc.

Functions of inventory control

To provide maximum supply service, consistent with maximum efficiency and optimum investment.
To provide cushion between forecasted and actual demand for a material.

Inventory control methods:

1. Intuitive method: This is the "want book method" that is most effective method. Here the items are recorded in the want book when the number of units in stock reaches close to zero. The amount ordered then is the best estimate for the storekeeper or worker in the field.
2. Perpetual inventory method: This is one of the best accurate and effective methods of inventory is, of course, an ideal situation if the record keeping can be kept up-to-date. In a ward situation, the nurse in charge of dispensing at the end of each day, summarizes all drugs issued to patients and make the proper posting in the perpetual inventory file. The file consists of appropriate forms.
3. ABC method: This method is based on the fact that some stock items have a much higher annual usage value than others. This after doing a cost analysis, stock items are separated into three classes with the following characteristics:

Class	Number of items	Rupee value in items
A	10 per cent of total items	70 per cent
B	20 per cent of total items	20 per cent
C	70 per cent of total items	10 per cent

4. VED method{vital, essential, desirable}: In this method each stock items is classified on either vital, essential or desirable based on how critical the item is for providing health services. The vital items are stocked in abundance, essential items are stoked in small amounts. By stocking items in order of priority. Vital and essential items are always in stock which means a minimum disruption in the services offered to the people.
5. Two-bin method: this methods separates the stock of each item into two Bins (Boxes). One bin contains the main stock; the second (small) bin contains enough stock to satisfy demand during the period necessary for replenishment. When the first bin is exhausted, an, order for replenishment is

immediately placed. In the mean time, stock in the second bin is used to satisfy demand until the replenishment stock arrives. Part of the new supply when it arrives, is used to fill the second bin, which against placed in reserve. The reminder of the replenishment stock is placed in the first bin, where it is available for issuing and use.

Techniques commonly used for inventory control are:

- ABC analysis
- Setting up of various levels
- Use of perpetual inventory, records and continues stock verification
- Economic order in quantity
- Review of slow- moving and non-moving items and
- Use of control ratios like

- Material consumer/average inventory
- Slow moving stores/total inventory
- Total inventory/ cost of production
- Cost of sales/ average finished goods inventory.

MATERIAL MANAGEMENT

Material management is concerned with providing the drugs, supplies and equipment needed by health personnel to deliver health services. Without proper material, health personnel cannot work effectively, they feel frustrated and the community lacks confidence in the health services and unless appropriate materials are provided in proper time and are required quantity, productivity of personnel will not be up to expectation.

Good material managers adopt the following procedures:

- Taking inventory regularly and systematically,
- Requisitioning at indenting according to actual needs
- Receiving and inspecting incoming items,
- Storing and protecting items,
- Issuing items for use,
- Proper use of items.

INTRODUCTION

Materials are an essential resource to achieve the objectives of a health care organization. While about 60% of the funds of health sector are consumed to provide manpower, health care being a labour intensive activity, almost 40% of the funds are used up for providing materials.

Good material managers adopt the following procedures:

- Taking inventory regularly and systematically
- Requisitioning at indenting according to actual needs
- Receiving and inspecting incoming items
- Storing and protecting items
- Issuing items for use
- Proper use of items.

The Main Purpose of material management:

1. Cost reduction
2. Avoidance of wastage and shortage
3. Ensuring adequate quality and quantity of material without delay in procurement

OBJECTIVES OF THE MATERIAL MANAGEMENT:

Material management brings about control over the acquisition, storage, retrevability, distribution, use and disposal of supplies and equipment in order to carry out the primary responsibilities of the organisation in an efficient, effective and economical manner. Material management seeks to ensure availability of the right materials at the right time, to the right place at the least cost.

ORGANISATION

Material management entails two basic functions: Purchase and Stores. These two functions maybe carried out independently through a separate store department and a purchase department, or the two functions may be integrated into a single store – purchase department.

Separate departments for purchase and store functions ensure minimisation of confusion, formalisation of data necessary for making effective purchases and specialisation of each of the two functions, which intrinsically are independent in nature.

An integrated store – purchase department has the following advantage:

1) A single authority can be held responsibility for the availability and control of materials. Thus there will be less chance for shifting blame from one department to another and there will be better coordination between the purchase and store functions.
2) Less paper work, as common recurs can be maintained (purchase and receipt registers can be combined).
3) The speed of transactions can be expedited as common information can be shared easily and informally between purchase and store personal.

PROCESS OF MATERIAL MANAGEMENT:

The process of material management involves planning, review and control of

1. Budgeting and material planning.
2. Demand forecasting.
3. Procurement, receipt, inspection and payment.
4. Storage and inventory control.
5. Issue and distribution.
6. Usage.
7. Maintenance.
8. Disposal.
9. Pilferage.

MODERN TECHNIQUES OF MANAGEMENT

1. MANAGEMENT INFORMATION SYSTEM

In today's formal organization the information on which crucial decisions may depend, are not only increasing day by day but the nature and the type of information cover a wide range. Consequently the volume and the range of information which generate the database on which vital decisions are dependent, are vast. Needled to add, therefore, that in order to plan, control and monitor the quality of services rendered in an organization, it is necessary that complete information or facts or data which are accurate, reliable, relevant and are made available timely.

There is not only close relationship between these two administrative and management functions but the need for the use of accurate and timely, the relevant information assumes an equal and crucial importance for these two functions. These data needed by the managers for;

i. Recommending course of action
ii. Recommending changes in courses of action
iii. Making predictions
iv. Drawing conclusions
v. Taking decisions administrative /corrective/budgetary
vi. Taking decisions for taking action

MEANING OF MIS AND HIMS

MIS means a formal system that provides timely and necessary information to the managers for making decisions.

Health management information system (HMIS), a part of MIS is a formal system that supplies timely and necessary health information to the health planners through surveillance for monitoring and making decisions in the area of health care delivery system.

The inter relationship of MIS and computer technology in the present day context cannot be over emphasized. Computer technology today has brought in a revolution. For handling the variety and the quality of information as well as for making this information available whin required, this technology has become indispensable in MIS, it is also a time saving device, as with proper development of software it saves man hours and supplies the information within the minimum possible time.

HEALTH MANAGEMENT INFORMATION SYSTEM

This is a MIS, which deals with health information for health management. Let us reproduce below the text given in this context in the national health policy of India.

Management information system appropriate decision making and programme planning in the health and related fields is not possible without establishing an effective health information system. A nationwide organizational setup should be established to procure essential health information. Such information is required not only for assisting in planning and decision making but also to provide timely warnings about emerging health problems and for receiving, monitoring and evaluating the various ongoing health programmes. The building up of a well conceived health information system is also necessary assessing medical and health manpower requirements and taking timely decisions on a continuing basis regarding the manpower requirements in the future.

SURVEILLANCE

Surveillance has immense importance in MIS as surveillance is an integral part of the MIS. One of the modules of the child survival and safe motherhood programme (CSSM), states an effective surveillance system is essential to achieve the above goals as reliable epidemiological data are necessary for effective planning, monitoring the quality of services and documentation of impact.

IMPORTANCE OF SURVEILLANCES

i. The data generated through surveillance are important in planning health services because they
ii. Highlight the magnitude of an illness as a public health problem
iii. Help in planning appropriate programme interventions based on epidemiological data.
iv. Monitor the quality of community and institutional health services being rendered.
v. Identify pockets of high risk for additional and specific actions.
vi. Estimate programme needs for drugs
vii. Help in accomplishment of national health policy goals.
viii. Document impact of health services reduction in mortality and morbidity rates, declining trends of diseases, prevention of cases, complications and death etc.

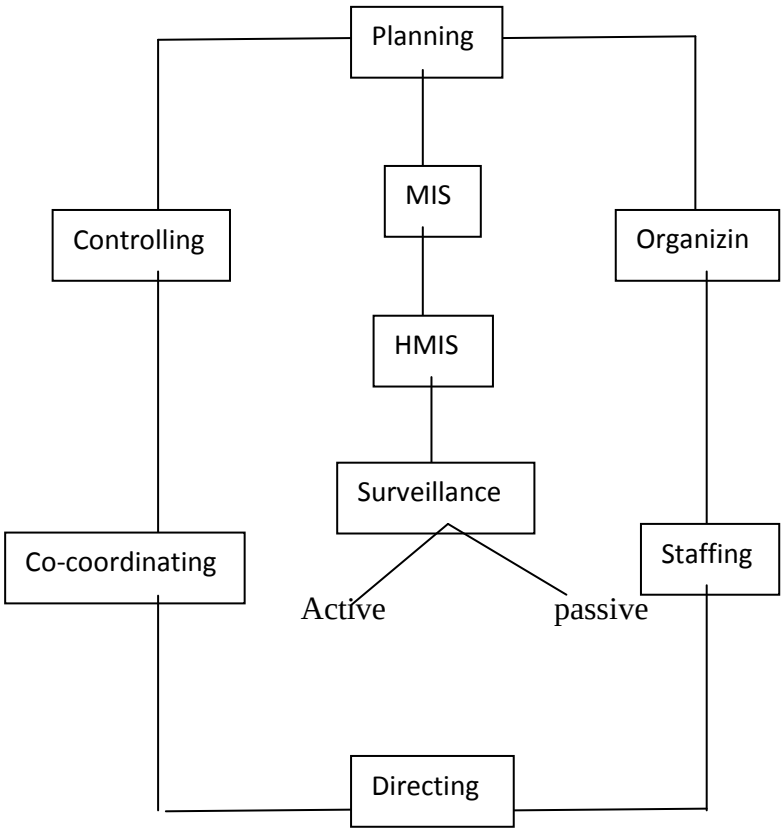
TYPES OF SURVEILLANCE

Surveillance is of two types, ACTIVE and PASSIVE

Nurses particularly public health nursing personnel are very much a part of the HMIS, which in turn is a part of MIS, because nurse at the periphery generate information by making conscious additional efforts for collecting epidemiological indices. This type of surveillance, where active participation of the concerned personnel come into play is known as active surveillance e.g. collecting information on fever cases and blood slides for detection of malaria.

Passive surveillance on the contrary is that type of surveillance, where health data are available from hospitals and other health facilities, where consumers come on their own seeking necessary health related interventions.

Relationship of MIS with the planning, organizing and the controlling functions with surveillance is shown diagrammatically.



2. MANAGEMENT BY OBJECTIVES

The concept

MBO is a way of practicing five basic management functions;

Planning, organizing, leading and controlling . George S. odiorne has stated MBO as

A process where by the superior and the subordinate managers of an enterprise jointly identify its common goals, define each individuals major areas of responsibility in terms of the results expected of him, and use these measures as guides for operating the units and assessing the contribution of each of its members.

BASIC TENENTS OF MBO

1. RESULT ORIENTATION
   One of the basic tenets of MBO is result orientation the other is the concept of human behavior and motivation .MBO is thus the result orientation and motivation or aims at achieving the laid down objectives influence policy, organization personnel, leadership. And control.

2. HUMAN BEHAVIOUR AND MOTIVATION

The second basic tent that supports the concept of MBO is human behaviour and motivation. In this respect let us discuss the theory of Abraham Maslow which is popularly known as "Needs Theory". The need theory is considered as a type of internal motivation because an individual's wants and needs exist within herself or himself. He or she is consciously aware of some of his or her needs but not conscious about others. Need theory is based on certain assumptions like:

- No need can ever be completely satisfied; hence only partial fulfilment of a need is required before another need is allowed to appear.
- Needs are constantly changing within an individual, and they are often hidden from one's consciousness.
- Since needs are often group related, they are often interdependent. How a person satisfies his/ her social needs is determined by his/ her socio-economic status.

Maslow's theory of Hierarchy of Human Needs was formulated in 1943. Kalish has further defined these needs into:

1) Survival needs
2) Stimulation needs
3) Safety needs
4) Love and belongingness needs
5) Esteem needs
6) Self actualisation needs

Fredrick Herzberg is another pioneer who has developed the "Motivation-Hygiene Theory".

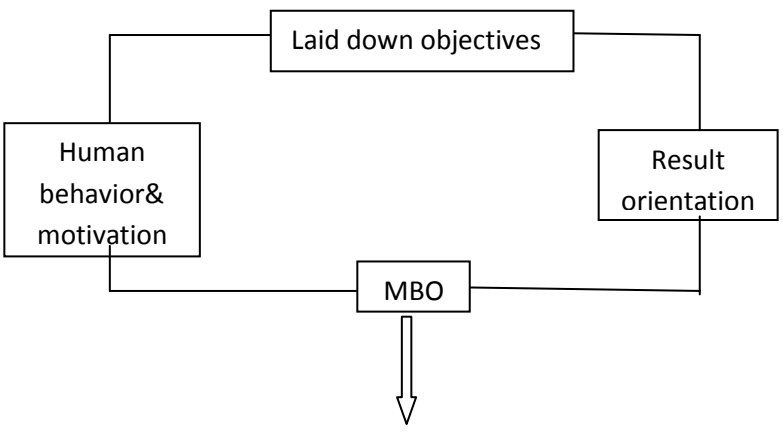
The development of the MBO concept owes a lot to the motivation theories. The assumptions that MBO takes into account about human behaviour are also dependent on these theories. MBO is essentially achievement and participation oriented.

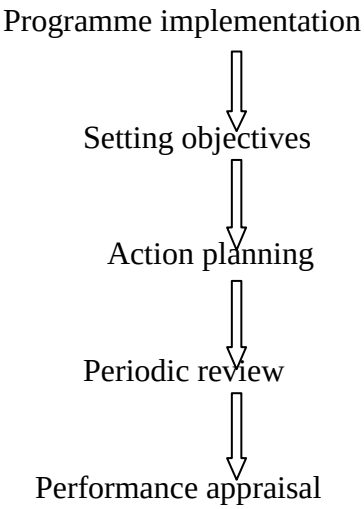
In practising MBO, it is essential that the employees are directly and actively involved in planning, directing and controlling of their jobs. Involvement brings in commitment, which in turn acts as the motivator for achievement of the organization objectives.

What is the MBO System?

MBO is the process by which the members of an organization jointly formulate the organizational goals. With the assistance from his/her supervision, each member:

- Define his/her area of responsibility accountability.
- Formulates specific objectives which he/ she is expected to accomplish.
- Develops performance measures to be used as standards for evaluation of his/her performance in terms of his/her contribution towards achievement of goals.





3. System approach to management
4. Computer technology in management

MISSION OR PURPOSE

MISSION STATEMENTS

A Mission Statement defines the organization's purpose and primary objectives. Its prime function is internal – to define the key measure or measures of the organization's success – and its prime audience is the leadership team and stockholders. Mission statements are the starting points of an organisation's strategic planning and goal setting process. They focus attention and assure that internal and external stakeholders understand what the organization is attempting to accomplish.

Dimensions of Mission statements:

According to Bart, the strongest organizational impact occurs when mission statements contain 7 essential dimensions.

- Key values and beliefs
- Distinctive competence
- Desired competitive position
- Competitive strategy
- Compelling goal/vision
- Specific customers served and products or services offered
- Concern for satisfying multiple stakeholders

The mission statement of an; organization describes the purpose for which that organization exists. Mission statements provide information and inspiration that clearly and explicitly outline the way ahead for the organization. They provide vision.

Individuals want productive and meaningful lives .therefore, the purpose of the organization and of each of its units should be defined a teamwork approach should be properly trained: and all individuals within the organization should be treated with respect.

Organizational purpose moves and guides the organization toward a perceived goal. Many writers indicate that the purpose or mission statement should be created from mission statement should be properly trained and all individual s within the organization should be treated with respect.

Organizational purpose moves and guides the organization toward a perceived goal. May writers indicate that the purpose or mission statement should be created from a vision statement that tells what the company stands for. The vision statement is created with the customer's needs in mind. To determine these needs ask and listen to the customer. External customers who purchase the products or service may be given a tour. In nursing, external customers are prospective patients and families, accreditation and licensing officials, faculty and students, and even taxpayers and shareholders. Employees are internal customers. The mission or purpose statement incorporates the culture of the organization, including strong leadership, rules and regulations, achievement of goals, and the notion that people are more important than work.

Employees who participate in developing the vision statement believe in their own abilities and are more committed to the organization. The vision statement is shared companywide so that employees live the vision. It is kept updated to keep pace with technology and trends. A vision statement is sometimes considered more strategic than a mission statement. The mental exercise of creating one is more meaningful than the contents of the statement itself. Vision, values, mission or purpose statements are meaningful only to the creators.

VISION

Employees who participate In developing the vision statement believe in their own abilities and are more committed to the organization than employees who do not participate. The vision statement is shared companywide so that employees may live the vision. It is updated to keep pae with technology and trends. A vision statement is sometimes. The mental exercise of creating one is more meaningful than are the contents of the statement itself.

Vision values, mission, or purpose statements are meaningful only to the creators. Translated for the community, these statements place value on the way nurses care for people. It follows that ethnic populations are considered in developing vision and values statements for nursing entities. Nursing education teaches the meaning of values such as tolerance and compromise.

Examples of values are informality, creativity, honesty, quality, courtesy, and caring.

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INVENTORY CONTROL, ABC ANALYSIS, VED ANALYSIS, CONDEMNATION AND DISPOSAL

Introduction:

Inventory control is a major activity in any organization. Nearly the entire working capital is utilized for inventory. In a manufacturing organization, stock out situation leads to production hold-up, idling of men, and non-usage machines, delayed deliveries causing loss both in financial and in terms of good will. Thus, inventory control is a balancing act and this is the reason why modern management focuses on inventory control.

Definition Of inventory control:

Inventory: inventory is the list of moveable items which are required to manufacture a product or to maintain equipment. Inventory is a unique item having identification number, nomenclature and specification.

Following are the types of inventory:

- Raw materials
- Components
- Work in progress
- Finished goods

The inventory is basically of two types:

Official inventory: the materials lying in the main store s and being accounted for but have not been issued to the user units.

a. Medical and surgical items
b. Dressings
c. Linens

d. X-ray supplies
e. Laboratory supplies
f. Housekeeping items
g. All processed sterile items

Unofficial inventory: the materials have been issued to the user units like the dispensary, CSSD, laundry, wards, OPD, cast rooms etc. In case of forecasting or demand estimation, these items are not taken into consideration by the hospital administration, so it is called as un-official inventory for hospitals.

Functions of inventory control:

- ✓ To carry adequate stock to avoid stock-outs
- ✓ To order sufficient quantity per order to reduce order cost
- ✓ To stock just sufficient quantity to minimize inventory carrying cost
- ✓ To make judicial selection of limiting the quantity of perishable items and costly materials
- ✓ To take advantage of seasonal cyclic variation on availability of materials to order the right quantity at the right time.
- ✓ To provide safety stock to take care of fluctuation in demand/ consumption during lead time.
- ✓ To ensure optimum level of inventory holding to minimize the total inventory cost.

Concepts relevant in controlling inventory costs:

The following concepts are relevant in controlling the inventory costs:

- Periodic/ cyclic system: this system involves review of stock status at periodic/ fixed intervals and placement of orders depending on the stock on hand and rate of consumption. The ordering interval is thus fixed but the quantity to be ordered varies each time.
- Two bin system: it is a system where the stock of each item is held in two bins, one large bin containing sufficient stock to meet the demands during interval between arrival of an order quantity and placing of next order, and the other bin containing stocks large enough to satisfy probable demands during the period of replenishment. When the first bin is empty, an order for replenishment is placed, and the stock in the second bin is utilized until the ordered material is received.
- Lead time: this is the period required to obtain the supply once the need is determined. It is therefore the average number of days between placing an indent and receiving the material. Lead time is composed of two elements: administrative or buyer's lead time (i.e. Time required for raising purchase requisitions, obtaining quotations, raising purchase order, order to reach supplier etc) and delivery or supplier's leading time (i.e. Time required for manufacture, packing and forwarding, shipment, delays in transit)
- Minimum/safety/ buffer stock: this is the amount of stock that should be kept in reserve to avoid a stock-out in case consumption increases unexpectedly or in case the lead time turns out to be longer than normal. It is also the level at which fresh supply should normally arrive, failing which action should be taken on an emergency basis to expedite supply and replenish the stock.
  Safety stock = maximum daily consumption-average daily consumption x total lead time
- Maximum order level: this is the maximum quantity of the materials to be stocked, beyond which the item must not be in the inventory. If the inventory is maintained beyond this point, there would be loss to the hospital by way of expiry of life items beyond the shelf life of items, loss incurred on the capital locked up in the inventory, unnecessary use of items just to exhaust the inventory.

- Re-order level: this is the value which is very important from the point of view of the inventory control. This is the point at which we have to place an order for procurement for replenishing the stock. It is derived by the formula (minimum order level + buffer stock)

Costs:

a. Ordering costs: this is the cost of getting an item into the store. The process of ordering starts with raising requisition, placing an order, follow up, transportation receipt and inspection, acceptance and placing in stores.
b. Carrying costs: this is the cost of holding an item in the store till it is issued out or sold. Following are the elements:-
   - ❖ Interest on capital cost incurred.
   - ❖ Cost of obsolescence, wastages, damages.
   - ❖ Rent, insurance, depreciation and taxes
   - ❖ Maintenance costs of inventory like special treatment, stock taking etc.
   - ❖ Operating costs of store like direct labor and overheads like electricity, dust proofing etc.
c. Shortage costs: these are the costs incurred both directly and indirectly due to shortages like intangible costs due to loss of goodwill, opportunity loss or production hold costs.
d. Total inventory cost: A total inventory cost consists of carrying costs and ordering costs.
e. Lead time: this is the time which has elapsed between placing an order till the same items are received, stocked and ready to use.

Average inventory:

Average inventory is defined in two cases:

- Average inventory at constant usage rate:

$$\text{Average inventory} = \frac{\text{opening stock} + \text{closing stock}}{2}$$

- Average inventory at variable usage rate:
  - Simple average method:

$$\text{Average inventory} = \frac{\text{opening stock} + \text{closing stock}}{2}$$

  - Six monthly average method:

$$\text{Average inventory} = \frac{\text{opening stock} + \text{stock after 6 months} + \text{closing stock}}{2}$$

- Quarterly average method:

$$\text{Average inventory} = \frac{\text{sum of 4\_ - quarterly stock} + \text{closing stock}}{5}$$

- Monthly average method:

$$\text{Average inventory} = \frac{\text{sum of 12\_ - quarterly stock} + \text{closing stock}}{13}$$

Selective inventory control:

Definition: selective inventory control means grouping the inventory and classifying for the purpose of applying the right type of control based on their costs and functional importance.

Objective: the primary objective of inventory control is to minimize total cost of inventory. It requires the following

- ✓ Supervision on planning and control of inventory functions like forecast of requirements
- ✓ Purchase quantity fixation
- ✓ Storage and supply

Need for selective inventory control:

- Inventory consists of many items, in which some are costly whereas some may be not.
- Some inventories are required in large quantities whereas some are required in limited quantities, thus each item require different type of control, some tight and some loose.

Methods of selective inventory control:

Following are the popular methods of selective inventory control:

a. ABC analysis
b. VED analysis

ABC ANALYSIS:

Also called as Pareto analysis. In ABC analysis, the entire lot of inventory is classified into three groups based on their annual value and not on their individual cost given as:

Class A: high value items, which accounts for major share of annual inventory value.

Class B: medium value items, which do not belong to either of the classes.

Class C: Low values items, but are required in large quantities and consists of various types and varieties like clips, washers.

Annual value (a) is defined as:

A= VQ, where, Q= annual consumption on quantity terms

V= value (cost) per item

ABC classification levels:

items	Class A	Class B	Class C
Number of items as a % of total number	10	20	70
Annual usage value as a % on total usage value	70	20	10

Procedure of ABC classification:

- ✓ Step 1:
  List down item-wise annual consumption of inventory with its unit price and determine the annual consumption of each item.

- ✓ Step 2:
  Rewrite the above list in descending order of money value with additional column to enter 'cumulative % value'.
- ✓ Step 3:
  a. From the list prepared, mark the serial number of items against which the cumulative % value of annual consumption reaches a figure of 70% approximately. These are called class A items and compute the number of class A items as a percent of total items.
  b. Continue this process down the list and note the serial number of items against which the cumulative % value reads approx. 90%. These additional items constitute class B.
  c. The remaining items in the list form class C items and determine quantity in percent of total number of items.
- ✓ Step 4:
  Plot a curve with cumulative percentage of annual usage on quantity terms on X-axis and money value on Y-axis.

Control:

- ➢ Class A items are controlled and purchased only on as-required basis to minimize carrying cost. Higher level control is exercised, these being high value items.
- ➢ Class C items can be purchased in bulk for the requirement of the entire year, being of low value. The control is exercised at lower level.
- ➢ Class B items come in between A and C on degree of control.

Limitations of ABC analysis:

i. When number of items runs into several thousands, it is not convenient to compute and carry out this analysis.
ii. More chances of deterioration in storage exist since class c items are purchased in bulk and inventory on these piles up.
iii. Loose control on C may result in shortages.
iv. ABC focuses on money value and not on functional importance of such items, resulting in shortages of critical items.
v. ABC does not take into account variation of prices of items as time goes.
vi. ABC ignores market conditions, market availability, competitions, seasonal variations etc.

VED ANALYSIS:

ABC analysis does not tell anything about the criticality of the items. This is an important variant in patient care services. Based on the estimation of the time length for which non availability can be tolerated, there are three categories. The stores when subjected to analysis based on their criticality can be classified into vital, essential and desirable stores. This analysis is termed as VED analysis.

In VED analysis, the inventory is classified as per the functional importance under the following three categories:

- Vital (V)
- Essential (E)
- Desirable (D)

- **Vital**: items without which treatment comes to standstill: i.e. non- availability cannot be tolerated. The vital items are stocked in abundance.
- **Essential**: items whose non availability can be tolerated for 2-3 days, because similar or alternative items are available. Essential items are stocked in medium amounts.
- **Desirable:** items whose non availability can be tolerated for a long period. Desirable items we stocked in small amounts.

Although the proportion of vital, essential and desirable items varies from hospital to hospital depending on the type and quantity of workload, on an average vital items are 10%, essential items are 40% and desirable items make 50% of total items available.

Purpose:

- In a manufacturing organization, there are number of items which are very vital or critical in production.
- Their availability must be ensured at all times for smooth production, so need to be strictly controlled.
- Essential items follow vital items in their hierarchy of importance.
- Desirable items are least importance in terms of functional considerations, which are loosely controlled at the lower level.

Matrix of ABC/VED analysis:

There can be combination of these two categories like a matrix combining ABC and VED categories. This matrix is more relevant in the hospitals. The AV category becomes the most important for inventory control because the items are very much cost consuming being a category and also vital for uses. These items can be controlled by the top-level management. The CD category items are not very costly and at same time of desirable category. These items can be controlled at the lower level.

	V	E	D
A	AV	AE	AD
B	BV	BE	BD
C	CV	CE	CD

Control of VED items:

a. Category I items: these items are the most important ones and require control by the administrator himself.
b. Category II items: these items are of intermediate importance and should be under control of the officer in charge of the stores.
c. Category III items: these items are of least importance which can be left under the control of the store keeper.
d. The grouping will essentially depend upon the strategy of management and the environment of functioning. However these simple techniques can be effective in material management system.
e. Items with high criticality (V), but required in small quantity (A) should receive highest priority. Items with low criticality (D) and which are required in big quantity should receive least priority.

CONDEMNATION & DISPOSAL

The materials which could not be used within its shelf life, deteriorated and declared unfit for use, became obsolete or banned due to legal provisions are considered for condemnation or disposal.

Criteria for condemnation:

The equipment has become:

1. Non-functional & beyond economical repair
2. Non-functional & obsolete
3. Functional, but obsolete
4. Functional, but hazardous
5. Functional, but no longer required

PROCEDURE FOR CONDEMNATION

Following procedure is generally carried out in case of the materials particularly drugs and non-drug items:

- A condemnation committee comprising of three or more members is constituted by the competent authority, the terms of reference of the committee are:
  i. To go in details of the reasons as to why this situation has occurred.
  ii. The people who are responsible for the lapses on the aspects from acquisition to storage and distribution of materials.
  iii. To suggest measures to be taken for disposal of the items.
- The committee members go into details through inventory records right from the point of demand estimation to the distribution level of materials, and will find out reasons for being an item surplus and remained unused.
- The committee will declare the items condemned and make recommendation for further disposal of items.
- The condemned items are to be destroyed, so it is to be taken out from the inventory registers, a write off sanction of the competent authority is obtained before final disposal.

- The items particularly medicines which are toxic and cannot be disposed of by burial or as per the relevant laid down rules under the subject of waste disposal.

The effective measures are taken for disposal of surplus items before it becomes unfit for use is:

- A list of surplus material is circulated among the hospital staff/user units requesting them to pay special attention for mobilizing such items and giving priority to this category of items.
- The surplus materials are transferred to other hospitals where these may be required.
- The surplus materials are offered to the manufacturer/ suppliers for buy back.
- In case of materials other than drugs like equipments, instruments any such articles are treated as salvage or scrap, whatever the case may be, action is taken accordingly:
  - The materials may be sold by inviting tender.
  - Open auctions of items through authorized auctioneers.

Conclusion

A thorough understanding and use of the techniques of materials management would help in ordering the supplies when needed, controlling their use, keeping them safely and in working order, and also motivating the personnel in the best use of equipment and drugs. This also prevents chances of non availability of equipments and drugs as being out of stock of these reduces the usefulness of the hospital system.

Net information:

Inventory control in hospitals is more than just procurement and usage. The proper controls and processes can save millions in healthcare costs by enabling a hospital to efficiently order and store just the right amount of supplies needed for patient care while tracking cost, tier pricing and patient charges associated with supplies and/or custom kits.

ABC analysis is a business term used to define an inventory categorization technique often used in materials management. It is also known as *Selective Inventory Control*.

ABC analysis provides a mechanism for identifying items that will have a significant impact on overall inventory cost, whilst also providing a mechanism for identifying different categories of stock that will require different management and controls.

When carrying out an ABC analysis, inventory items are valued (item cost multiplied by quantity issued/consumed in period) with the results then ranked. The results are then grouped typically into three band. These bands are called ABC codes.

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