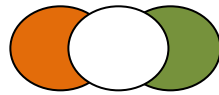Post Graduate Certificate Course in Health System and Management - 2013

Module 5: Chapter 1

Inventory Control

Indian Association of Preventive and Social Medicine

Gujarat Chapter

INVENTORY CONTROL

Learning objectives: At the end of this chapter students will be able to know

1. What is inventory & issues involved with its management

2. Principles of inventory control

3. Some Terms involved with inventory management

4. Reordering system

5. Types of inventory control

Inventory may be defined as "*usable but idle resource having an economic value*".

It can also be described in financial terms as the sum total value of raw materials; semi processed and finished goods at any given time.

When we deal with tangible (touchable) items such as materials, it is called '*stock*'. The literal meaning of word inventory is 'stock of goods'.

With limited availability of funds, & inventory costing almost 20 to 30% of the total cost of any organisation or system, inventory management assumes considerable importance. With proper inventory control there would be saving of scarce resources which could then be utilised for other important purposes & thus help in providing better services thereby contributing to the development of the organisation/system & ultimately the nation.

The basic issue involved in inventory management is to ensure that adequate amount of raw materials are available to meet the demand of the organisation, while at the same time ensuring that too much inventory is not accumulated and also that there are no 'stock-outs' in the organisation. Thus, a well managed organization would necessarily have a higher inventory turn-over rate and lesser cash would be blocked as inventory/stocks. In order to manage any organisation without affecting its outputs, some amount of 'inventory' is necessary so that raw materials are available in correct quantity at correct time. Similarly, in a health care establishment some inventory of essential drugs and supplies has to be maintained to ensure that health care to patients does not suffer.

In any hospital, high quantities of inventory in form of large number of costly drugs and supplies would be detrimental to profitability and smooth running of the hospital due to blocking of cash in form of idle stores, requirement of large storage space for medical stores, substantial handling and transportation charges, pilferage and cost of expired medical stores.

The ultimate aim of inventory control in a healthcare setting is to ensure that adequate and optimal essential items are properly stored, controlled, are easily retrievable and distributed to points of uses so that patient care does not suffer due to lack of these essential medical supplies & at the same time simultaneously minimizing the inventory cost.

Principles of Inventory Control:

1. Determination of required items in terms of quality & quantity.

2. Identification of suitable source of procurement of those goods.

3. Ensuring timely supply of these goods.

4. Proper storage of received goods

5. Effective control mechanism of stock through regular record keeping

6. Timely distribution & appropriate usage of stocks

7. Employment of trained personnel for store keeping

8. Determination of re-order point - when should re-ordering be done

Some Important Terms in relation to Inventory Control

A. **Order Cost**: The cost of placing an order for inventory. It includes advertising costs, salaries of personnel required to determine the inventory, stationary cost. At times, a professional expert may also have to be called from abroad or the manager may be required to visit a foreign country to place an order, in which case the ordering cost would also include the travel cost etc. Amongst all the salaries of persons involved in ordering is maximum & thus persons dealing with purchasing should be kept to a minimum.

B. **_Purchase cost_** is the actual cost paid for the purchase of materials & stores, and the aim should be to reduce this as far as possible without compromising on the quality and quantity of items purchased.

C. **_Inventory carrying cost_**: are the hidden costs and pertain to maintenance of a large inventory/stock, which lies idle and which blocks the finances of the organisation. Special efforts are required by a manager to identify these carrying costs, since they are often hidden and not easily decipherable (readable, understandable). Some such inventory carrying cost are:

(i) *Cost of borrowed money* which is the interest paid to a financier or the interest lost which could have been earned, had a large amount of money not been used for purchasing the stock presently held as inventory;

(ii) *Cost of space:* which needs to be hired for storage, utilised for storage & which could have been utilised for other activities;

(iii) *Cost of additional manpower:* by incurring additional expenditure on salaries, etc. of manpower required to manage the stocks;

(iv)*Cost of obsolescence* (out of date): All materials, especially hospital supplies, become obsolete, leading to financial loss;

(v) *Cost of deterioration* : Supplies when stored for a very long time tend to deteriorate with time, especially crucial hospital supplies like injections, medicines and intravenous medicines etc; and;

(vi) *Cost of pilferage:* A large and unmanageable inventory is bound to lead to pilferage and loss to the organisation.

(vii) Cost of insurance: Expensive inventory also needs insurance against unforeseen conditions

D. **Shortage costs** are the 'direct' and 'indirect' costs paid by an organisation for not having a particular item in ready stock. The impact of this shortage would depend on the criticality of that item and its importance for functioning of the organisation. In a hospital set up, let us assume that there is a sudden shortage of life saving drugs like Digoxin. The *direct cost of this shortage* would be in form of the expenditure incurred by the hospital in procuring these drugs urgently from the open market at a premium. The '*indirect cost*' would be in the form of adverse publicity, suspended healthcare in form of refusal of admissions and may be a few avoidable deaths due to shortage of those critical drugs.

E. Lead Time: It is the time required between placing an order & receiving the same. The delays are at – administrative level, production level, transportation level & finally inspection & storage of received items.

F. Buffer Stock: it is the amount of stock kept in reserve for any unforeseen emergency conditions of variations in demands or supply. It is the difference maximum & average consumption rates per day multiplied by the Lead time for that item.

G. Reorder Level (ROL): it is the stock at which fresh order has to be issued. It is calculated as average consumption per day multiplied by the lead time plus the buffer stock. This will prevent stock out.

H. Stock turn-over: It is necessary to see that items are utilised before their expiry or warranty period. So first in first out rule is to be followed.

I. Economic order quantity: it is that quantity at which the total of annual ordering cost & annual inventory carrying cost are lowest.

The purpose of inventory is to find the optimal levels of stocks holdings & re- ordering levels along with amount so that total cost is minimized.

Eg: suppose a hospital needs Rs 100000 of certain medicines a year. The ordering cost is Rs 50/order & the inventory carrying cost is 10% of the average inventory.

How to calculate average inventory? If medicines worth Rs 1 L are purchased for a year, the inventory will be near to 100% - 90% in early part of the year & gradually decrease to 10 to 0% by the end of the year. So we can say that the average inventory will be equal to 50% i.e Rs 50,000.

No. of orders /year	Order size (Rs)	Average inventory	Annual carrying cost (10 %)	Annual ordering cost @ Rs 50/order	Total cost
1	100000	50000	5000	50	5050
2	50000	25000	2500	100	2600
5	20000	10000	1000	250	1250
10	10000	5000	500	500	1000
20	5000	2500	250	1000	1250
25	4000	2000	200	1250	1450

Thus from the table it is clear that the hospital should order 10 times in a year for the given inventory to have the total cost of inventory at minimum.

If the annual consumption of an item is high, orders are placed frequently so that the inventory level is low as possible. Items whose annual consumption value is not high & cost is less, sufficient stocks are maintained & orders are placed less frequently.

Reordering System: 2 types:

    a. Cyclic system / fixed order interval: the size of the order may fluctuate with demand - malaria drugs. The ordering interval is fixed. It is necessary to see that stocks do not fall between the reviews less than required during the lead time.

    b. Bin system / fixed order quantity: the frequency of ordering varies again determined by demand. E.g. PCM.

The Fixed order size system is more suitable for C & low value B items. The fixed order interval system with frequent & careful reviews is more suitable for A & high value B items.

If there is a risk of stock out the fixed order interval system requires more of safety stock as compared to fixed order size system.

Types of Inventory Control

Pareto, a German economist found that in any given city, 20% of the people controlled 80% of the income & 80% of the other people controlled only 20% of the finances of the city. This 'Pareto's law' also forms the basis for inventory control, wherein it is theorized that a few items in the inventory will account for a large proportion of total cost whereas bulk of the items will account for only a small percentage of the cost or importance of total inventory. Thus, basic principle of inventory control is based on the effort to closely control costly / critical items in inventory all the time, while other, less important / less costly items could enjoy less stringent controls.

Various selective inventory control measures are as under:-

(a) ABC: Inventory control based on annual total cost of items and not on unit cost of an item. This type of inventory control is described in detail subsequently.

(b) VED: Based on criticality and importance of consumables, items are classified as Vital (V), Essential (E) and Desirable (D).

(c) HML: Items are classified based on cost of individual item as High cost (H), Medium cost (M) and Low cost (L). This classification does not depend on consumption of items.

(d) SDE system is based on the ease of availability of items and items are classified as Scarce (S), Difficult to obtain (D) and Easy to obtain (E).

(e) GOLF system is based on the source of supply & includes Governmental sources (G), Ordinary (O), Local (L) and Foreign (F).

(f) FSN: Items are classified based on the rate of issue from the stores into Fast-moving (F), Slow moving (S) and Non-moving (N) items.

(g) SOS is the classification of items based on Seasonal (S) and Off-seasonal (OS) availability.

(h) XYZ is the classification based on the value of stocks of items held.

An ideal inventory control mechanism would ensure the optimal quantity of resources at all times at all places where they are required for smooth & unhindered operations and would prevent stock- outs and under-stocking. At the same time, a good inventory control system would also prevent over-stocking and blockage of vital finances in form of idle stocked stores. In a health care setup, a good inventory control systems would improve the service delivery and enhance patient satisfaction, reduce the operating (functional) costs of the hospital, increase efficiency and liquidity (cash availability), thereby improving the return on investment (ROI).