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Review Article

DIFFERENT METHODS OF INVENTORY CONTROL - AN IMPARTANT PROCESS IN PHARMACEUTICAL INDUSTRY

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ABSTRACT

The inventory management system plays a vital role in a pharmaceutical industry. For every business, managing an inventory is important whether it is small or big, domestic or international business. In a pharmaceutical company, the raw materials have an expiry date associated with them so it becomes important to set a minimal safety stock for such items. The companies mostly try out keeping a minimum stock of products which will help in tracking our business easily. Small businesses, both manufacturers and retailers, now have the opportunity to reduce inventory-related costs significantly through the use of various inventory techniques. The literature acknowledges the capacity of diverse inventory management techniques to reduce material wastages while simultaneously increasing cost-efficiency, thereby helping the organization to achieve superior performance.

KEYWORDS: *Pharmaceutical industry, Inventory Control, Cost reduction, Wastage Control.*

INTRODUCTION

1. Inventory control: [1, 2]

Inventory means all raw materials, spare parts, tools, lubricants; semi processed materials and finished goods recorded in the books of any organisation at any given point of time. For smooth working of the business organisation, a sound inventory should be maintained because an average of 30% ofthe working capital is spent on inventories.

Inventory is a list of names, quantities and or monetary values of all or any groups of items.

2. Objectives of inventory control: [1, 2]

1. To maintain sufficient inventory so as to avoid production held upthis leads to customer dissatisfaction, loss of revenue and increase in cost.
2. To avoid excess investment in inventory.
3. To improve customer service.
4. To keep plant cost low. The overall plant costs are kept low by stable production which is possible only by having sufficient inventories.

3. Functions of inventory control: [1, 2]

1. Men, machine and material are properly utilised.
2. The products can be supplied to the consumer at a short notice as and when the demand is received.
3. Wastage of material and theft of material can be checked.
4. To assess the material requirement systematically.
5. To obtain and supply the required quantity of the materials at the lowest cost and in proper time.
6. To keep the inventories as low as possible this leads to consistent price of market conditions.
7. To maintain proper records and toassess the stock position of the materials.

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Techniques of Inventory Cntrol: [3-5]

1. ABC analysis or ABC method.
2. VED analysis.
3. Economic Order Quantity (EOQ) method.
4. Safety stock method.
5. Maximum stock level.
6. Minimum stock level.
7. Reorder level.
8. Lead time.
9. Inventory turnover rate.

1. ABC analysis or ABC method: [6]

ABC method means 'Always Better Control' method: This is a selective analysis based on annual inventory value which is found out as follows:

Annual usage value= (annual requirement) × per unit cost.

It is observed that any organisation has to stock and keep tract of large number of items of different kinds. Thus for better and more economic control of items in inventory the items should be classified according to their significant or priority for recording. The production manager should recognise the unequal contribution of different items in the inventory and the fact that equal effort should not be sent on improving the inventory policy of items. Thus for better and economic control of items in inventory, the items should be classified according to their significant or priority for reordering.

The inventory of high value items (in terms of annual usage) is to be controlled carefully due to high turnover and heavy investment. This can lead to substantial saving due even a small percentage decrease in inventory. For the lowest value items (in terms of annual usage), the cost of inventory management is significant and should be controlled because it may be more than the possible inventory savings.

Hence, this technique with a selective approach concentrates time and attention upon the items in terms of their monetary turnover. According to this approach, the items are classified into three main categories.

1. A class.
2. B class.
3. C class.

A class items:

1. These items cover 10% of total inventories.
2. It consumes about 70% of total budget.
3. Hence these items require strict monitoring.
4. They require either no safety stock or low safety stock.
5. They need max follow up.
6. The items must be handled by senior officers.

Tight control measures are envisaged at all stages which include:

1. Determination of purchase schedules.
2. Demand forecast for consumption.
3. Safety stock fixation.
4. Receipts and inspection procedures established.

Following measures can be adopted to exercise control over items in this group:

1. Purchase on exact requirement basis.
2. Waste control measures should be adopted.
3. Cheaper substitutes should be discovered.
4. Frequent periodical checking for materials issued.
5. Only the required amount of materials should be issued.
6. Order should be placed after technical and commercial inquiry.
7. Pilferage preventive measures.
8. Low safety stocks should be maintained.

B class items:

1. It covers 20% of total inventories.
2. It consumes 20%of total budget.
3. It requires moderate control
4. It requires low safety stocks.
5. It needs periodic follow up.
6. It can be handled by middle management.

The following steps are required:

1. Purchase should be based on exact requirements.
2. Costing should be done on average basis per accounting.
3. The store keeper should check personally the stock and periodically check-up should be done.

C class items:

1. This class of items cover 70% of total inventories.
2. It consumes 10% of total expenditure of inventories.
3. It may require lose control.
4. It requires high safety stocks.
5. It needs close follow up.
6. It can be handled by any official of organisation.

Some important measures to be adopted for this category of items are:

1. Visual quantity control is sufficient rather than paper control.
2. Purchase should be based on estimated usage.
3. Costing should be done on average basis for accounting.
4. Infrequent checking of the level of ordering should be clear and counter-checking by store keeper would be sufficient.

Table No. 1: The items in A,B, and C classes can be compared in the following tabular column

S. No.	A	B	C
1	Maintain close control	Maintain moderate control	Maintain lose control
2	Size of order based on calculated requirement.	Size of order based on usage.	Size of order based on the level of inventory.
3	Procured from many sources.	Procured from two or three sources.	Procured from two sources.
4	Keeps records of receipt and use.	Keeps records of receipt and use.	No records are kept.
5	More effort to reduce lead time.	Moderate effort.	Minimum effort.
6	Close checks on schedule revision.	Some checks on changes in need.	No checks against need.
7	Frequent ordering.	Less frequent ordering.	Bulk ordering.
8	Continual expediting.	Expediting for prospective storage.	No expediting.
9	Accurate forecasts.	Less accurate forecasts.	Approximate forecasts.
10	Low safety stock for less than 2 weeks.	Large safety stock upto 2 to 3 months.	Large safety stock for more than 3 months.
11	High consumption value.	Average consumption value.	Low consumption value.

Advantages of ABC analysis:

1. It ensures better control over costly items.
2. It helps in developing scientific method of controlling inventories.
3. It helps in maintaining the stock in a better way.
4. It helps in reducing the storage costs.
5. It helps in maintaining enough stocks of group A, B, and C items.

Application of ABC analysis:

ABC analysis can be applied at various stages of material management. The stages are:

1. Stores lay out.
2. Value analysis.
3. Stocks records.
4. Priority treatment to different items.
5. Determination of safety stock limits.
6. To evolve useful re-ordering strategy.
7. Information of items which require higher degree of control.

2. V-E-D analysis: [7]

VED analysis means Vital, Essential, and Desirable analysis: This system is based on the utility of the materials. Based on the usage, the items or materials are divided into three categories vital, essential and desirable items.

Vital materials are the most essential items for production. Without these materials, production is stopped for a period of several days or even months. Since the cost of materials is high and so it takes longer time to purchase and replace the material. Essential items are the one which are very essential for production. Without this material, production is stopped only for few hours or a day. Since the material is not so costly hence it can be purchased and replaced easily.Desirable items, these are needed by an organisation but do not cast any effect on its performance.

In a drug store, VED analysis is very useful in controlling and maintaining the stock of various types of formulations of a particular group of drugs. The older the brand, the greater will be the requirement. The past trends are not useful in calculating the requirements of a particular brand.

For ex: Diclofenac sodium is available as voveran, Diclomov and Diclo-joint then Voveran is vital (more demand)Diclomov is essential (less demand) and Diclo-joint is desirable (very few prescriptions). So maximum inventory of voveran should be kept.

3. Economic order quantity (EOQ) analysis: [8]

This model gives the information about how much to pay and when? EOQ model also illustrates how much amount to be spent on buying to keep costs at minimum.

Two types of costs:

1. Procurement cost.
2. Carrying cost.

Procurement cost $\propto$ no. of orders.
Procurement cost $\propto$ 1/amount of investment.
Carrying cost $\propto$ amount of investment.
Carrying cost $\propto$ 1/orders.

Procurement cost: communication media cost, checking inventory, receiving and checking goods, marking and stocking goods, paying for goods.

Carrying cost: interest on loan, obsolescence loss through theft, deterioration or damage, storage (insurance or property tax), labour cost on storage.

EOQ model provides a level of inventory at which the combined costs of procuring and carrying inventory are at a minimum.

Table No. 2: Example of EOQ Analysis:

Value of order	No. of orders per year	Procurement cost	Average active inventory (high of value of order)	Carrying cost (10% of average active inventory)	Total cost
720	1	4	360	36	40
360	2	8	180	18	26
240	3	12	120	12	24
180	4	16	90	9	25
144	5	20	72	7	27
120	6	24	60	6	30

Now when you order the goods 3 times procurement cost and carrying cost becomes equal and that is the economic order quantity.

$$EOQ = [2*(CP)*(D)/Ch]^{1/2}$$

CP = procurement cost.
D=demand of products expressed in units.
Ch= holding or carrying cost of the investment.

D and Ch must be expressed in comparable terms with respect to time and quality. If D is expressed as the amount in Rs. that will be purchased in one year, the Ch must be expressed as the annual percent in decimal form which represents the holding cost. This cost usually20 to 30%.

4. Safety stock method: [9]

A firm has to keep adequate safety stock as well as ordinary stock. Over-stocking goods are known as safety stock.

Inventories are generally divided into "Working stock" (quantity of the inventories that are ordered) and "safety stock" (over stocking of goods).

If the demand is stationary or if there is no much variation in demand, there is no need for safety stocking of inventories. When the demand increases, safety stock level can be increased. Depending on the demand one can decide whether the good can be stocked or over-stocked. The safety stock of an item depends on its lead time, usage value and its carrying cost. If the lead time is longer, then it is necessary to stock the inventories. If the value is high, the safety stock level of the item is kept at the minimum. Depending on the carrying cost also one can decide whether the good can be stocked or not.

5. Minimum stock level: [10]

The stock of any item should not be allowed to fall below the lower limit. This is known as minimum stock level, the particular item should not go out of stock. If the items are out of stock level should be maintained. This level is determined by considering the following factors:

1. Rate of consumption of materials.
2. Reorder level.
3. Time taken to receive fresh supplies from the producers or from the distributors.

Minimum stock level is determined the formula:

Minimum stock level=reorder level-(normal consumption per week* average time taken to receive Fresh Supply)

6. Maximum stock level: [11]

The stock of any items should not be allowed to rise beyond the upper limit. This is known as maximum stock level. Any item should not be stocked too much. If the stock level is beyond the upper limit, the company many incur loss if there is no demand on particular items.

The maximum stock level is determined by considering the following factors:

1. Rate consumption of materials.
2. Reorder level.
3. Time taken to receive fresh supplies from the producers or from the distributors.
4. Amount of capital needed and available.
5. Market trend.
6. Nature of material.
7. Government restrictions.

Maximum stock level=reorder level- minimum consumption per week.

7. Reorder level: [12]

Reorder level is the stock position between minimum and maximum stock level. The reorder level is always slightly more than the minimum stock level. When the stock of any item reaches at reorder level, the process for the purchase of materials should be started.

Reorder level=minimum consumption per week* maximum time taken to receive fresh goods.

OR

Reorder level= Average consumption/13*(average supplier lead time + safety factor).

Supplier lead time (in weeks)	Safety factor
0-5	1
5-8	1.5
8-11	2
11-13	2.5
13-15	3

8. Lead time: [13]

The time interval between the placing the order for purchase of certain items to the time, the materials are actually received in the stores. It has two important components

1. Administrative or servicing lead time.
2. Supplier's lead time.

Administrative or servicing lead time:

It is also known as internal lead time and it is the time taken by the organisation for placing the order which includes time taken for calling the quotations, preparing comparative statements, inspecting the material and then placing the orders.

Suppliers lead time:

The time gap between the placements of order to the receipt of goods in the store is known as suppliers lead time.

9. Inventory turnover rate: [14, 15]

Turnover rate means how many days product remains in the store. To minimise inventory most of the time small orders are laced when required but in long run its a costly affair. More modern and reliable method is computing the inventory turnover.

Turnover rate=cost of goods sold during financial year/ average of opening and closing stock.

This gives the number of times the inventory or individual item has been turned during the financial year.

Turnover can be defined by another way as "turnover is developed as a measure of rate of sale is equal to the number of times an article is sold and replaced over a period, usually one year.

A low turnover rate may be due to:

1. Duplication of stock.
2. Large purchases of slow moving items.
3. Dead inventory.

A high turnover of inventory may be due to: [16, 17]

1. Small volume of purchasing.
2. Failure to take advantage of maximum quantity of discounts.

A turnover 10 times in a year for retail and 8 times a year for wholesale is satisfactory. From turnover rate one can get turnover of stock as a whole and turnover of individual items.

CONCLUSION

The inventory management system plays a vital role in a pharmaceutical industry. For every business, managing an inventory is important whether it is small or big, domestic or international business. In a pharmaceutical company, the raw materials have an expiry date associated with them so it becomes important to set a minimal safety stock for such items. The companies mostly try out keeping a minimum stock of products which will help in tracking our business easily. Small businesses, both manufacturers and retailers, now have the opportunity to reduce inventory-related costs significantly through the use of various inventory techniques. The literature acknowledges the capacity of diverse inventory management techniques to reduce material wastages while simultaneously increasing cost-efficiency, thereby helping the organization to achieve superior performance.

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