



IJPPR

INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals

ISSN 2349-7203




Human Journals

Review Article

October 2016 Vol.:7, Issue:3

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Importance of Inventory Control Techniques in Ayurveda Hospitals – A Critical Review



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INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals

ISSN 2349-7203



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Submission: 10 October 2016
Accepted: 15 October 2016
Published: 25 October 2016

Keywords: Inventory, Stock, Investment, Minimal cost, Scientific methods

ABSTRACT

The pharmacy is one of the most extensively used therapeutic facilities of the hospital and one of the few areas where a large amount of money is spent on purchases on a recurring basis. This emphasizes the need for planning, designing and organizing the pharmacy in a manner that results in efficient clinical and administrative services. The goal of the hospital supply system is to ensure that there is adequate stock of the required medicines so that an uninterrupted supply of all essential medicines is maintained. Inventory control in hospital pharmacy is essential in a developing country like India. The purpose of inventory management is to ensure availability of materials in sufficient quantity as and when required and to minimize investment in inventories. As resources are limited, it is essential that the existing resources be appropriately utilized. It is essential that health managers use scientific methods to maximize their returns from investment at a minimal cost.



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INTRODUCTION

Inventory means physical stock of goods. A study conducted by the Department of Personnel and Administrative Reforms in India has revealed that not only does the quantity of medicines received fall short of the requirement but also the supply is often erratic. Even common medicines are out of stock and remain so for a considerable period. From the various explanations for non-availability of even simple medicines, a large number are related to materials management. With the existing drug budget, if rational drug use and improved drug management practices are followed, number of patients can be served. Drug inventory management stresses on cost containment and improved efficiency. Each item may be considered critical and there is a perceived need to supply very high levels of service. There is no denying that stocking hospital pharmacy and supplies can be expensive and tie up a lot of capital, and bringing efficiencies to such important cost drivers often 30-40% of a hospital's budget can present meaningful savings. Thus, a hospital materials manager must establish efficient inventory system policies for normal operating conditions that also ensure the hospital's ability to meet emergency demand conditions. But, it is impossible and unnecessary too to monitor every drug used in the health system. High-cost and high-volume drugs come in priority, whose intervention is likely to cause the greatest clinical and economic impact. The system of Ayurveda embraces within its fold, drugs of plant, animal and mineral origin both single drugs and compound formulations. Ayurvedic compound formulations are divided into two groups

1. Kashthaushadis (predominantly plant drugs)
2. Rasaushadhis (predominantly metals and minerals)There are several categories of Kashthaushadhis formulations such as Asava- Arishtas, Avaleha, Ghrita, Churna, aila etc. and of Rasaushadhis such as Bhasma, pishti, lauha, mandura, Kupipakva rasayan etc. All these formulations have different shelf life. (Table 1)

Table No1: Table Showing shelf life of Ayurvedic Medicine

S.No	Name of the Group of Ayurvedic Medicine	Shelf life and date of expiry
1.	Eye Drops , Arka	1 year
2.	Churna, Kwatha churna, Ghrita, Ear-Nasal drops, Dhoopan- Inhalers, Danta manjan powder,varti	2 years
3.	Gutika (Vati,Pills,Tablets), Avaleha, Taila, Ghan Vati, Syrup/liquid oral, Khanda/Granule/pak, Pravahi Kwatha, lepa churna/Guti/malahar, soft gelatin capsules	3 years
4.	i) Gutika tab. contains Kasth aushadhi	3 years
	ii)Gutika tab.contains Kasth aushadi and Metallic bhasma and guggulu	5 years
5.	Rasaushadhis, Asava-Arishta, Kupipakva-rasayan, Parpati, Pishti, Bhasma	No expiry date
6.	Mandura-Lauha	10 years

Aim of Inventory Control

The aim of inventory control in hospital is to:-

- a) Maintain availability of item anywhere anytime in the hospital at optimum cost.
- b) Optimize cost by analyzing holding cost, ordering cost and stock out cost to have minimum cost of inventory.
- c) Minimize dead stock and obsolesce.

Types of Inventory Management Techniques :-

- ABC :- This would depend upon annual consumption cost of items and not on unit price of the items. This is control on cost basis.
- VED :- Vital, Essential, Desirable. It is based on vital and critical items availability like oxygen, life-saving drugs and many consumables which are vital for hospitals, the stock out of such vital items is not acceptable.

- FSN :- Fast moving, Slow moving and Non-moving. It is based on issues from stores.
- SDE :- Scarce, Difficult, Easy to obtain classification based on availability of items.
- HM L:- High, Medium and Low based on unit price.
- XYZ :- Based on value analysis. Used in analysis of slow-moving items.
- SOS :- Season Off Season. Based on seasonal requirement.

Functions of Inventory Control

Basic functions of inventory control are-

- To provide maximum service consistent with maximum efficiency and optimum investment.
- Provide a cushion between the forecasted and actual demand for a material.
- Stocking of adequate amount, number and range of items.
- Gives optimal outlay of financial and human resources.

The hospitals have to keep certain inventory stocks due to following reasons:-

- a) There is time lag in procuring items which is called 'lead time' that means time taken to procure item.
- b) The hospitals have to keep certain reserve stocks to service hospital requirement during lead time which is called "safety stock" or buffer stock.
- c) There would be larger safety stock if there is uncertainty in procurement.
- d) The inventory to be kept would depend upon striking a balance between ordering cost, inventory carrying cost and minimum obsolescence of consumable since some of the drugs have very short shelf life but have to be available always due to its vitality. The cost of not having items at times is more costlier than having it.

The hospital image and patient satisfaction would largely depend upon good inventory control which means minimize ineffective stock yet items available when required.

The efficient inventory system in health institution can:-

- i. Improve availability of items especially vital drugs always to be available.
- ii. Reduce cost by minimum obsolescence and dead stock.

- iii. Improve patient satisfaction by giving better service.

The quantum of inventory to be kept would depend upon following factors:-

a) **Lead Time** : The lead time is a time lapse between placement of order and actual receipt of order. This can be due to internal factor like time to prepare order called 'internal lead time' and due to external factor in executing order called 'external lead time'. Thus $\text{lead time} = \text{internal lead time} + \text{external lead time}$.

b) **Cost** : This would depend upon

- i) Ordering cost that is cost associated with placing a purchase order expressed as rupees / order.
 - ii) Inventory carrying cost that is cost associated with holding of one unit of inventory for one time period of a year.
 - iii) Obsolescence or dead stock- Cost of Material not demanded for a long time.
 - iv) Quantity discount- bulk purchases can be made at lower unit price.
 - v) Reorder point- The point on which action for replacement of stock is initiated by placing an order.
 - vi) Buffer stock- A safety stock is needed to absorb variation in demand and supply and also cater for lead time.
- c) Requirement to be worked out based on quantity in stock and transit, Consumption pattern, seasonal variation related with seasonal disease, and workout fluctuation in demand and utilization. A computer can generate data for last five years giving a consumption pattern, demand and supply and buffer stock which can optimize future demands.
- d) Shelf life - The shorter shelf life items to be kept in smaller numbers.
- e) Storage space- The inventory would also depend upon storage space available including cool room required for the drugs.

The factor determining inventory policy should be based on

- a) Requirement
- b) Lead time
- c) Cost factors
- d) Financial policies

- e) Availability of credits
- f) Obsolescence
- g) Government policies
- h) Storage factors

Techniques of Inventory Control

The inventory control is a scientific system by which we decide as to how much to order when to order and how often to order, ensuring availability of vital and essential drugs all the time but keeping cost minimum. There are several procedures to classify the inventory with regards to different basis, for example, value of consumption, criticality, consumption pattern and source or supply. Three types of techniques that can be utilized are described below:

1. ABC Analysis

ABC analysis is an important tool used worldwide, identifying items that need greater attention for control. ABC analysis is a method of classifying items or activities according to their relative importance. It is also known as “separating the vital few from the trivial many” because, for any group of things that contribute to a common effect, a relatively few contributors account for a majority of the effects.

The limitation of ABC analysis is that it is based only on monetary value and the rate of consumption of the item. In a hospital, an item of low monetary value and consumption may be very vital or even life saving. Their importance cannot be overlooked simply because they do not appear in category A. Therefore, another parameter of the materials is their criticality.

This is based on Pareto's Law where 20% items may be accounting for 80% of total cost annually. The analysis focus on cost of items and need to control these items. There are significant few which require most attention. The ABC analysis states:-

- a) 10% of drugs would cost 70% of the total cost of drugs (Group A).
- b) 20% of drugs would cost 20% of total drug cost (Group B).
- c) 70% of drugs would cost 10% of total cost (Group C).

The items which are small in number but consume large amount of resources are known as “A” items. Items which are intermediate in number and consume intermediate amount of resources are known as ‘B’ items and “C” items are very large in number but consume significantly low amount of resources.

2. VED Analysis

VED analysis is based on critical values and shortage cost of the item. Based on their criticality, the items could be classified into three categories: vital, essential and desirable.

- a) Vital items are those items whose shortage cannot be tolerated even for shorter periods and without which functioning of hospital is seriously dislocated. Ex. Life-saving drugs
- b) Essential items are those items whose shortage can be tolerated for short period only. But if not available over a long period, will adversely affect the hospital functioning.
- c) Desirable items are those items whose shortage will not adversely affect the patient care and hospital functioning.

Such an analysis enables the administrator to give more attention to vital and essential items.

3. Combining ABC and VED Analysis

Findings of ABC/VED Analysis could be coupled together and further grouping is done to evolve a priority system of management of stores.

	V	E	D	
A	AV	AE	ADCategory1.....70%
B	BV	BE	BDCategory2.....20%
C	CV	CE	CDCategory3.....10%

- Drugs in category 1 include all the vital and expensive drugs.
- Category 3 includes all the unimportant drugs, which are neither vital nor expensive.
- Drugs in category 2 are of intermediate category.

Drugs in category 1 require close monitoring and strict controls, which is not the case for category 3 drugs.

4. Economic Order Quantity (EOQ)

The model was first proposed by Harris in 1915 and further developed by Wilson in 1928. It is known as EOQ or Wilson's lot size formula. The dealing with stock items are how much to order and when to order. EOQ provides answer to how much to order and Reorder point answer when to order.

EOQ means the most economical quantity of material for which order is to be placed. The ordering cost and the inventory carrying costs are antagonistic to each other. EOQ model is related to carrying costs of inventory, ordering, and usage to determine the most economical size of inventory.

EOQ is determined when the ordering and carrying costs are equal.

Formula used to determine the EOQ is $\sqrt{\frac{2AO}{C}}$

Where A is Annual consumption

O is Ordering cost

C is carrying cost

EOQ tries to balance two variable cost to minimum level

Good storage practice –

- Alphabetical arrangements
- As per classification adopted in Formulary
- As per pharmacological action
- FIFO Principle- First in First out
- Monitoring shelf life

In nutshell importance of Inventory management techniques are-

- Easy to manage costly medicines using ABC Analysis which also checks pilferage as its level of control is tight.

- Availability of vital and essential medicines will be ensured throughout the year without disturbing the allocated budget.
- Pattern of usage in previous financial years will direct the inventory order pattern.
- Calculation of EOQ helps the manager determine when to order for inventory and how much to order to be most cost effective.
- The maximum and the minimum stock levels are worked out to establish the Re-order level.

CONCLUSION

Increasing expenditures on pharmaceuticals is a major concern for healthcare systems worldwide but the situation is more worrying in developing countries because of the scarcity of financial resources. Analysis of medicine expenditures in Ayurveda hospitals is rarely reported since most hospital pharmacy departments do not do it as part of the routine annual evaluations. Specifically, it is not well known as to what extent these inventory management techniques are employed in these hospitals as part of their pharmaceutical management strategies. If these scientific techniques are used it will be very easy to manage the stock of costly Herbo-mineral formulations like kupipakwa Rasayan and Rasaushadhis, vital medicines like Guggulu preparations, Medicated oils and Ghritas, various Churna, Vati(Tab), Asava-Arishtas etc without fearing the condition of stock outs.

Analysis of medicine expenditures has an impact on the inventory management particularly on the type of medicines to be ordered and hence it has the direct impact on the quality of service provided. It also has an effect on the management of financial resources, especially on budget allocation.

This analysis may be used to improvise inventory management techniques which also adds knowledge of categorization and identification of medicine items that consume large part of the budget hence requiring special inventory management as well as on how funds are being spent in procuring medicines so that the principles of good pharmaceuticals procurement strategic objectives are achieved. The findings will also be useful in proposing areas of improvement in procurement of medicines and its management. It also suggests measures to facilitate better performance of pharmacy regarding assessment of plan and priorities on purchasing medicines,

increase efficiency in resource use at the hospital and enhance accountability and hence improve quality of health care.

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