Analysis of drug consumption in rural health center of tertiary care teaching hospital, Kancheepuram district, Tamil Nadu

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Abstract
Introduction: With advanced medical care and drugs, consumption of drug cost from budg*et al*location is high. It has been proved that control measures in monitoring drug consumption have resulted in 20% saving in cost utilization. By using various material management measures, appropriate drug utilization in usage and cost can be designed. **Objectives:** Apply ABC – VED to classify a drugs in the pharmacy of a rural health centre into logical groups. Identify the vital few items among the drugs (A class) than the trivial many (C class) to enable differential control. **Material and Methods:** Study was undertaken in a rural health centre of a teaching hospital in Tamilnadu. The list of drug consumption and expenditure between January to December 2013 was transcribed in a spreadsheet and ABC-VED analysis done and then categorized into three. **Results:** The annual drug expenditure on drugs in the hospital for 2013 was Rs. 3, 94,886.21. On ABC analysis, Category A has 8 items with a percentage of about 15.09% and consumes 69.02% (Rs. 2,72,76.64), Category B has 12 items with a percentage of 22.64% and consumes 21.21% (Rs. 83,774), category C has 33 items (62.26%) which consumes 9.70%. By VED analysis, Vital drugs consumes 61.47% (Rs. 2,42,754.56) with 22 items of 41.05% of total drugs, Essential drugs consumes 33.6% (Rs. 1,31,349.67) of with 23 items of 43.39% of total drugs and Desirable drugs consumes 5.2% (Rs. 20, 781.98) of cost with 8 items of 15.09 % of drugs. There were 24 (45%) items in category I of which 6 items are both expensive and vital, 2 items are expensive and essential. 22(41%) in category II constituted 7 items intermediate cost and essential, 1 item was in intermediate cost and desirable group, 14 items belonged to low cost and essential group. 7(13%) in category III were of low cost and desirable group. **Conclusion:** Majority of the resources been utilized by fewer drugs, which requires strict control. Application of inventory management tools for efficient management of the pharmacy drugs and close supervision on items belonging to important categories is needed. ABC-VED matrix analysis identifies the drugs requiring stringent control for optimal use of funds and to avoid out-of-stock situations.
Keyword: ABC-VED analysis, Inventory control, Medical stores, Material management.

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INTRODUCTION

Health care is responsibility of both public and private sectors. Fortunately, or unfortunately our modern medical science relies on pharmacotherapy. With advanced medical care and drugs, consumption of drug cost from budg *et al* location is very high. The drugs that has been provided in most of tertiary care teaching hospitals are available free of cost for the patient. From a study it has been proved that control measures in monitoring drug consumption have resulted in 20% saving in cost utilization[1]. It is the responsibility of the hospital to ensure maximum utilization of available resources, aiming at efficacy as well as cost containment.

By using various material management measures, appropriate drug utilization in usage and cost can be designed. Inventory control is very essential in a developing country like India[2]. The purpose of material management is to gain economy in purchasing, to maintain reserve stock to avoid stock outs and to stabilize fluctuations in consumptions. The key objective of this study is to apply selective control techniques (viz. ABC - VED) to classify a considerably large number of drugs in the pharmacy of an RHC into some logical groups based on annual value, rate of consumption, and criticality of items. The aim behind this approach is to identify the vital few items among the drugs (A class) than the trivial many (C class), so that management can keep differential control over them[3].

Table 1: ABC analysis:

Items	Percentage of items (%)	Cost consumption of items
A	10	70
B	20	20
C	70	10

There are many types of products classification and categorizations available for inventory optimization like ABC, XYZ, FSN, SDE, VED, HML etc. ABC analysis can be used for different purposes. The requirements and application of these different analysis depends on the aim of inventory control desired, hence a careful selection is necessary[4]. ABC analysis well known as "Always Better Control" is widely used method in material management; it is based on cost consumption of the item. According to ABC analysis, items has been grouped as Group A, Group B, and Group C. Group A will have 10% of total items consumes 70% of budget. Group B will consume 20% of fund with 20% items. Group C with the rest 10% budget and 70% of items. (Table 1) As criticality of drugs can't be analyzed by ABC alone, another well-known method VED analysis is used as additional parameter. "V" is for vital items without which a hospital cannot function, "E" for essential items without which an institution can function but may affect the quality of the services and "D" stands for desirable items, unavailability of which will not interfere with functioning. This method was undertaken to identify areas for further improvement and also to find corrective interventions.

MATERIAL AND METHODS

The study was conducted in a rural health center of tertiary care teaching hospital at Kancheepuram district,

Tamilnadu. For the purpose of the study, data of annual consumption of all drugs and expenditure was collected from pharmacy for the year 2013 (January to December). The data was transcribed in MS excel spreadsheet and statistical analysis has been done. For ABC analysis, as a first step the annual consumption of all the drugs was calculated. Annual expenditure was calculated by multiplying unit cost by annual consumption and the results were arranged in descending order of rupee value. Drugs were categorized as A B C based on their total consumption values of 70%, 20%, and 10% respectively. The VED analysis of all drugs was done for classifying the drugs into vital (V), Essential (E) and Desirable (D) categories. The drugs which are critically needed for patient's survival and must be available at the hospital at all-time were included in vital group. Drug which are of lower critical need and which may be present were included in essential group. Rest of drugs which are of lower criticality or absences of drugs which will not affect patient's health or smooth functioning of the centre were classified as desirable group. The VED status of drugs were discussed with medical practitioners and finalized. Subsequently, all the drugs in the pharmacy were listed under V, E and D groups. Cross tabulating of ABC and VED analysis was done to formulate a matrix to evolve the management system. This is done for the purpose of prioritization. The matrix combination gave a combination result of three categories.

Category I: AV, AE, AD, BV, and CV
Category II: BE, CE and BD
Category III: CD[5]

In these categories, the first alphabet denotes the ABC analysis and the second alphabet denotes its place in VED analysis.

RESULTS

The total Annual drug expenditure on the drugs of the hospital, utilized and issued during 2013 (January – December) was Rs. 3, 94,886.21. On ABC analysis, Category A has 8 items with a percentage of about 15.09% and consumes 69.02% (Rs. 2,72,76.64), Category B has 12 items with a percentage of 22.64% and consumes 21.21% (Rs. 83,774), category C has 33 items (62.26%) which consumes 9.70% (Rs. 38,335.20). The cut-offs were not pertaining to the classical examples of 70%, 20%, 10% exactly. (Table 2)

Table 2: ABC analysis of drugs

Drug analysis	A(70%)	B (20%)	C (10%)	Total
Annual Drug Consumption (in INR)	2,72,776.64	83,774.37	38,335.20	3,94,886.21
Percentage of consumption	69.07	21.21	9.72	100
Number of items	8	12	33	53
Percentage of items	15.09	22.64	62.27	100

By VED analysis, Vital drugs consumes 61.47% (Rs. 2,42,754.56) with 22 items of 41.05% of total drugs, Essential drugs consumes 33.6% (Rs. 1,31,349.67) of expenditure with 23 items of 43.39% of total drugs and Desirable drugs consumes 5.2% (Rs. 20, 781.98) of total cost expenditure with 8 items of 15.09 % of the total drugs (Table 3)

Table 3: Distribution of drugs by VED classification

Category of drugs	No. of Drugs	Percentage of drugs	Expenditure	Percentage of expenditure
Vital	22	41.50	Rs. 2,42,754.56	61.47
Essential	23	43.40	Rs. 1,31,349.67	33.27
Desirable	8	15.10	Rs. 20,781.98	5.26
Total	**53**	**100**	**Rs. 3,94,886.21**	**100**

Table 4 shows ABC - VED cross analysis data, from which the items where categorized into Category I, II, III (Table 4)

- CATEGORY I –
  AV+BV+CV+AE+AD
  6+4+12+2+0 = 24 (45%)
- CATEGORY II –
  BE+CE+BD
  7+14+1 = 22 (41%)
- CATEGORY III –
  CD
  7 (13%)

Table 4: ABC – VED Matrix

Category of drugs	V	E	D
A	6 (AV)	2 (AE)	0 (AD)
I B	4 (BV)	7 (BE)	1 (BD)
C	12 (CV)	14 (CE)	7 (CD)

☐ Category I   ☐ Category II   ☐ Category III

There were 24 (45%) items in category I of which 6 items are both expensive and vital, 2 items are expensive and essential. 22(41%) in category II constituted 7 items intermediate cost and essential, 1 item was in intermediate cost and desirable group, 14 items belonged to low cost and essential group. 7(13%) in category III were of low cost and desirable group. The criticality factor of a drug alone cannot be taken into consideration; the cost factor also should be taken into consideration. In this study there were about 70% of annual drug expenditure were from 20% of drugs, which consisted of not only vital drugs category but also drugs from essential and desirable groups. Majority of the resources has been utilized by fewer drugs, which requires strict control.

DISCUSSION

This study examined the consumption of medicines, which were prescribed for patients attending rural health center. The study of drug consumption was based on integrated ABC - VED-analysis, this type of analysis is of great use to the management for making decisions in order to utilize medicine fund in optimized way. In the present study Category A had 8 items with a percentage of about 15.09% and consumes 69.02%, Category B had 12 items with a percentage of 22.64% and consumes 21.21%, category C has 33 items (62.26%) which consumes 9.70% (Table 2). The study results obtained is similar to the ABC-VED analysis done in Government Medical College Hospital Nagpur, where Group A comprises 10.7 %, Group B 20.6 % and Group C 68.6 %[6]. There were 24 (45%) items in category I of which 6 items are both expensive and vital, 2 items are expensive and essential. 22(41%) in category II constituted intermediate cost and essential drugs of 7, 1 item was in intermediate cost and desirable group, 14 items were there in low cost and essential group. 7(13%) in category III were of low cost and desirable group. A study undertaken in a tertiary care teaching hospital in Pune, Maharashtra showed 57%, 35% and 8% belonged to category I, II and III respectively.[vi] A similar study undertaken in a tertiary care hospital in Srinagar showed 24 items (15.38%) belonged to Group A, 35 items that is 22.43% to Group C, and 97 items that is 62.17% to Group C.[vii] The present study shows out of 53 items, from ABC – VED analysis, category I comprises of 24 items, which is 45% of total items. Any decrease in unavailability drugs or less in availabity of the drug from this category should be avoided. As of from category I AD has no consumption from budget 0%, which indeed is a good. Material management by reducing the item from this category doesn't affect the health care delivery system. Category II consist of 22 items i.e. 41% of total items with category III containing remaining 7 items of 13% in total. Strict management of category I drugs will help in saving of in annual consumption, but a keen watch on the drug availability must be followed. As these items are expensive or vital items. Category II and III items can be ordered less frequently, which helps in saving on ordering cost. (Table 4) The difference between vital drugs (41 %) is less when compared with essential drugs (43%) which can be regularised by less ordering of items in E group thereby increasing the items in V group. As of for D group 15% is acceptable, if felt necessary, reduction of items of this group can be done for counter benefit of

other group. By combination of ABC – VED analysis, it was noticed that low buffering of stock have to be maintained to prevent maximum resource allocation for some items, with strict vigil on consumption level and stock in hand. Application of inventory management tools for effective and efficient management of the pharmacy drugs and close supervision on items belonging to important categories is the need of hour. ABC-VED matrix analysis identifies the drugs requiring stringent control for optimal use of funds and to avoid out-of-stock situations in the medical stores.

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