ABC and VED Analysis of the Pharmacy Store of a Tertiary Care, Academic Institute of the Northern India to Identify the Categories of Drugs Needing Strict Management Control

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ABSTRACT

Aim: To conduct ABC, VED and ABC-VED matrix analysis of the pharmacy store of the tertiary care, teaching, research and referral institute of the Northern India to identify the categories of drugs needing strict management control. **Method:** The ABC and VED (vital, essential, desirable) analysis of the pharmacy/drug store of Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh, India, was conducted to identify the categories of drugs needing strict management control. The annual consumption and expenditure incurred on each drug item of pharmacy for the year 2008-09 and 2009-10 were studied and inventory control techniques, i.e. ABC, VED and ABC-VED matrix analysis, were applied. **Results:** The drug formulary consisted of 416 items (year 2008-09) and 379 drug items (year 2009-10). The total annual drug expenditure (ADE) on items issued in 2008-09 & 2009-10 was Rs 6.04 crores to Rs 4.84 crores respectively. ABC analysis of pharmacy store for the year 2008-09 revealed 11.23%, 24.60% and 75.4% items as A, B and C category items, respectively, accounting for 70.19%, 19.83% and 9.98% of ADE of the pharmacy. VED analysis showed 12.30%, 61.5% and 26.2% items as V, E, and D category items, respectively, accounting for 19.56%, 71.12% and 9.33% of ADE of the pharmacy. However ABC analysis of pharmacy store for the year 2009-10 revealed 11.08%, 22.16% and 66.75% items as A, B and C category items, respectively, accounting for 70.04%, 19.93% and 10.02% of ADE of the pharmacy. VED analysis showed 12.40%, 60.16% and 27.44% items as V, E, and D category items, respectively, accounting for 25.05%, 66.91% and 8.04% of ADE of the pharmacy. **Conclusion:** The ABC and VED techniques should be adopted for optimal and rational use of resources and elimination of out-of-stock situations in the hospital pharmacy.

Key words: ABC analysis, ABC-VED matrix, Inventory Management, Pharmacy, VED Analysis.

INTRODUCTION

Professionalization of hospital management has been receiving much attention in recent times.

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This is because, more and more, it is becoming obvious that sound managerial practices are necessary for effective delivery of hospital care. Pharmacy stores are very essential supportive service of any hospital and as the hospital grows in size the need of pharmacy store also increases. No hospital can ever think of its existence without a pharmacy store. As in the modern days the concept of quality services is gaining grounds and patients are more conscious about the services rendered to them. In a study it was revealed that about one-third of the annual hospital budget is spent on buying material and supplies, including medicines.[1] There is need for planning, designing and organizing the pharmacy in a manner that results in efficient clinical and administrative services.[2] Hospital pharmacy inventory control is very important in a developing country like India.[3] In view of limited resources, it is important that the existing resources should be utilized appropriately. More number of patients can be served with in the available budget by adopting the improved drug management practices and rational drug use. Health managers should use scientific methods for maximizing their returns from investment at a minimal cost.[3–6] The cost containment and improved efficiency should be stressed for hospital drug inventory management.[7] Every drug item may be considered critical and there is a professed need to supply very high levels of service.[8] The stocking of hospital pharmacy items can be expensive and majority of hospital capital is held up in these items and it can be reduced by 30-40% of a hospital's budget by bringing efficiencies to important cost drivers.[9] Therefore, 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.[10] It is not possible for hospital managers to monitor each and every drug used in the hospitals. Thus, the hospital manager should monitor the high-cost and high-volume drugs, which in turn is likely to cause the great clinical and economic impact. In the beginning of the process, it is important to identify the costliest drug items, and then to design a strategy for further study and identify their use pattern. The study of use pattern will help in designing suitable remedial actions. ABC analysis is an important tool used worldwide, identifying items that need greater attention for control.[3-6,11] In this, 10% items consume about 70% of the budget (Group A). The next 20% inventory items take away 20% of the financial resources (Group B) and the remaining 70% items account for just 10% of the budget (Group C). With the use of ABC, costing was found to be more detailed and precise and overhead costs diminished drastically.[12] Among various inventory control models, Economic Order Quantity (EOQ) has been commonly used which attempts to balance the carrying cost of inventory with the cost of

running out of an item.[13] EOQ in conjunction with ABC has been proposed to be effective and efficient.[14] Most of the savings with the ABC-EOQ were reported with the low value items (B and C items) which were being purchased too frequently.[15] Automated capital budgeting systems have been claimed to reduce capital spending by identifying utilization trends.[16] VED analysis commonly used in hospital inventory management is based on the criticality of an item. "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. We undertook this economic analysis of drug expenditure in PGIMER, Chandigarh, a leading tertiary care hospital of Northern India to identify areas for further improvement as well as to find corrective interventions. Objective of the study is to analyze the annual consumption of pharmacy items and to calculate the annual expenditure incurred on them for the year 2008-2009 & 2009-2010 with the help of priority system based on ABC & VED and ABC-VED matrix analysis

MATERIAL & METHODS

The list of the drug items used in the pharmacy store were taken year wise and the annual consumption of each drug with the unit cost of the drug was also retrieved from the records. The cumulative expenditure incurred on each item was calculated for both the years.

ABC Analysis

The annual expenditure of each drug item was calculated and was arranged in descending order and cumulative expenditure of each item was also calculated. The cumulative percentage of the expenditure and cumulative percentage of items (year wise) was also calculated. Thereafter, the drugs were divided into three groups [i.e. A, B & C] based on their cumulative annual expenditure percentage of 70%, 20% & 10% respectively.

VED Analysis

The drugs were divided into three categories based on their criticality and utility for the patients. The drug formulary list was divided into the same VED category which was previously developed for the VED analysis in the year 2007-2008. The same VED classification was followed and the number & percentage of drug items in each category was calculated and the percentage of the cumulative expenditure incurred on each category was also calculated.

ABC-VED matrix analysis

The ABC-VED analysis was done by cross tabulating the results of ABC & VED analysis. Nine different subgroup categories were prepared and they were further divided into three different classes i.e. class I consist of AV, AE, AD, BV & CV and class II consist of BE, BD & CE and class III consist of CD. In these subcategories the first alphabet depicts its place in ABC classification & the second alphabet depicts its place in VED classification.

RESULTS AND DISCUSSION

The drug formulary of the Institute was consisted of 416 drugs and a sum of Rs. 6,04,38,225.37 was incurred in the year 2008-2009. The drug formulary was consisting of 379 drugs and a sum of Rs. 4,84,16,516.37 was incurred on them in the year 2009-2010. Pharmacy plays the most important role in hospitals. The hospital services depend on the timely availability of the drugs. The expenditure on pharmacy items takes away a major portion of the hospital budget. In our study it was evident that cost is an important factor as 10% of the drugs consumed about 70% of the ADE of the pharmacy. Therefore, the hospital manager should put more emphasis on the monitoring of this group of drugs. Further, it was also noted that the desirable category of drugs were also included in this group in addition to vital or essential drugs. Thus, ABC-VED matrix model would helps to narrow down on fewer drugs requiring strict management control.

ABC Analysis

In the year 2008-2009 out of the total drug formulary , 42 (11.23%), 92 (24.6%) & 282 (75.4%) items were in the A,B & C categories respectively costing for a sum of Rs. 4,24,20,519.58 (70.19%), Rs.1,19,83,767.52/-(19.83%) & Rs.60,33,938.27/- (9.98%) respectively (Table 1).

In the year 2009-2010 out of the total formulary 42 (11.08%), 84 (22.16%) & 253 (6.75%) of the items were in the group A, B & C respectively accounting for expenditure of Rs.3,39,14,814.87/- (70.04%), Rs.96,49,948.54/- (19.93%) & Rs.48,51,752.96/- (10.02%) respectively (Table 2).

The cut offs were not exactly 70%/20%/10% and differed slightly which is acceptable.

This study showed that ABC analysis would help in effectively controlling the recommended 42 (11.23% to 11.08%) drug items in the A category, with almost 70% of ADE of the drug store. The shortcoming of ABC analysis is that, it would compromise on the availability of items of vital nature from B and C categories (34-38 items, 9.0% to 10.16%). The results of the study are comparable with similar studies conducted in India Table.[37, 17-20]

VED Analysis

In the year 2008-2009, 46(12.3%), 230 (61.5%) & 98 (26.2%) items were grouped into V, E & D categories respectively and a sum of Rs.1,18,21,381.5/-(19.56%), Rs.4,29,80,978.14/- (71.12%) & Rs. 56,35,865.73/- (9.33%) was spent on these items in their respective categories (Table 1).

In the year 2009-2010, 47 (12.4%), 228 (60.16%) & 104 (27.4%) item were placed into the V, E & D categories and institute had spent Rs.1,21,27,424.23/- (25.05%), Rs.3,23,95,477.49/- (66.91%) & Rs. 38,93,614.65/- (8.04%) on the respective category of drugs (Table 2).

If VED analysis alone is considered, ideal control can be exercised on the identified vital and/or essential items, accounting for 72.56% to 73.80% of ADE of the pharmacy. However, category A also contains two to four (0.5% to 1.07%) desirable items and hence it is not possible to ignore the desirable group completely. The comparison with Devnani et al study showed similar percentage of

Table 1: The ABC, VED and ABC-VED Matrix Analysis of the PGIMER Pharmacy Store (Year 2008-09)

Category	Number of Items	% of items	ADE (In Rs.)	% of ADE of the Pharmacy
A	42	11.23	4,24,20,519.58	70.19
B	92	24.60	1,19,83,767.52	19.83
C	282	75.4	60,33,938.27	9.98
V	46	12.30	1,18,21,381.5	19.56
E	230	61.5	4,29,80,978.14	71.12
D	98	26.2	56,35,865.73	9.33
I	80	21.38	4,60,09,861.08	58.27
II	218	58.27	1,25,08,217.56	20.69
III	76	20.32	19,20,146.69	3.18

Table 2: The ABC, VED and ABC-VED Matrix Analysis of the PGIMER Pharmacy Store (Year 2009-10)

Category	Number of Items	% of items	ADE (In Rs.)	% of ADE of the Pharmacy
A	42	11.08	3,39,14,814.87	70.04
B	84	22.16	96,49,948.54	19.93
C	253	66.75	48,51,752.96	10.02
V	47	12.40	1,21,27,424.23	25.05
E	228	60.16	3,23,95,477.49	66.91
D	104	27.44	38,93,614.65	8.04
I	75	19.80	3,62,46,678.89	74.87
II	218	57.54	1,07,16,429.42	22.12
III	86	22.7	14,53,408.06	3

Table 3: Comparison of the ABC, VED and ABC-VED Matrix Analysis of the PGIMER Pharmacy Store of different years with different studies in India

Category	Present Study (2008-09)	Present Study (2009-10)	Devnani etal study, PGIMER, Chandigarh [20](2007-08)	GMCH Goa, Study[17]	Service Hosp, AFI Study[19]	GMCH, Nagpur Study[7]	CGHS, Study[18]
A	11.23	11.08	13.78	12.93	14.46	10.76	17.81
B	24.60	22.16	21.85	19.54	22.46	20.63	22.60
C	75.4	66.75	64.37	67.53	63.08	68.61	59.59
V	12.30	12.40	12.11	12.36	7.39	23.76	5.14
E	61.5	60.16	59.38	47.12	49.23	38.12	58.90
D	26.2	27.44	28.51	40.52	43.38	38.12	35.96
I	21.38	19.80	22.09	22.99	20.92	29.15	21.58
II	58.27	57.54	54.63	41.67	48.92	41.2	56.16
III	20.32	22.7	23.28	35.34	30.16	29.59	22.26

All The Values are in %

vital, essential and desirable items; however comparison with other similar studies in India showed variation in the percentage of vital, essential and desirable items Table.[7, 17-20] This could be because different institutes have different service profiles, depending on the specialty services available.

ABC-VED Matrix analysis

For year 2008-2009 when the ABC & VED tables are cross tabulated for ABC-VED matrix analysis, nine different subcategories were formed and these were further subdivided into three classes viz. class I, II & III and it was found that they constituted 80 (21.4%), 218 (58.29%) & 76 (20.3%) items of the formulary which account for Rs. 46009861.08/- (76.13%), Rs. 12508217.56 (20.7%) & Rs.1920146.68/- (3.18%) respectively (Table 1).

However on doing the same matrix analysis for the year 2009-2010 it was found that 75 (19.79%), 218 (57.52%) & 86 (22.69%) items were in class I, II & III respectively which account for Rs. 36246678.89 (74.86%), Rs. 10716429.42/- (22.13%) & Rs. 1453408.06 (3.00%) respectively (Table 2).

In a combination of ABC and VED analysis, the resultant matrix makes it possible to focus on 19.80% to 21.38%

items belonging to category I for strict managerial control as these items are either expensive or vital. The annual expenditure of these items was 74.5 % to 76.12% of ADE of the pharmacy. AV, AE and BV subgroups of category I consist of 56 to 59 items (14.80% to 15.76%) that are expensive (72.51 to 72.7% of ADE), and their being out of stock is unacceptable as they are either vital or essential. To prevent locking up of capital due to these items, low buffer stock needs to be maintained while keeping a strict vigil on the consumption level and the stock in hand. A two-bin method of ordering needs to be followed for these as this will eliminate the risk of item shortage. CV items (17, 4.55%) are drugs of low cost but high criticality and take up 0.75 to 0.81% of ADE of the pharmacy. Because this amount is negligible, these items can be procured once a year and stocked as their carrying cost is low.

AD items (2 to 4, 0.5 to 1.07%) consume 1.612% to 2.64% of the ADE. These items should be monitored for economic order quality, and their order placement must be made after careful study of the need. Rational use of items in this subgroup, including their removal from the list if possible, can bring about substantial savings without affecting patient care.

Category II items (218, 57.54% to 58.27%) consumes

20.69% to 22.12% of the ADE. These items can be ordered once or twice a year, thereby saving on ordering cost and reducing management hassles at a moderate carrying cost and without blocking substantial capital. Category III items (76 to 86, 20.32% to 22.7%) consume 3% to 3.18% of the ADE. These items can also be ordered once or twice a year, thereby saving on ordering cost at a moderate carrying cost and without blocking substantial capital. The comparison with similar studies in India is shown in Table 3.[7, 17-20]

CONCLUSION

The total annual drug expenditure (ADE) of hospital pharmacy store in the year 2008-09 & 2009-10 was Rs 6.04 crores and Rs 4.84 crores respectively. Therefore, it becomes important to apply scientific inventory management tools for optimum management of the drug stores, to set priorities in an optimum way, timely decision making in purchase of specific drugs and close supervision on drug items belonging to important categories. Thus, ABC and VED analysis can be utilized to pin point the drugs necessitating strict management control for effective & efficient utilization of hospital funds and elimination of out-of-stock situations in the hospital pharmacy.

CONFLICT OF INTEREST

Authors declared no conflict of interest.

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