Research Article

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ABC-VED matrix analysis of Government Medical College, Aurangabad drug store

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ABSTRACT

Background: Substantial improvement can be brought about in the hospital inventory and drug expenditure by inventory control techniques. These include ABC (always, better and control), VED (vital, essential and desirable) and ABC-VED Matrix analysis. The objective of the study was to categorize the drugs based on cost and criticality aspects and identify those which require stringent managerial control.

Methods: The ABC analysis according to expenditure on drugs and VED analysis according to the criticality of the drugs was done for drug store of GMCH, Aurangabad for the period of April 2014 to March 2015. ABC-VED matrix analysis was done to classify drugs into Category 1, 2 and 3. Category 1 included drugs requiring top managerial control, whereas category 2 and 3 included drugs requiring middle and lower managerial control respectively.

Results: The total number of the drug items used by the medical store was 119. The total drug expenditure was Rs. 4,08,53,968. By ABC analysis, it was found that 16.8%, 21.8% and 61.4% items belonged to A, B and C category respectively, accounting for 70%, 20.1% and 9.9% of expenditure. VED analysis showed that 35.3%, 50.4% and 14.3% were V, E, and D category items respectively, accounting for 34.3%, 49.5% and 16.2% of expenditure. By ABC-VED matrix analysis, 47.9%, 43.7% and 8.4% were found to be category I, II and III items respectively, accounting for 82.3%, 16.5% and 1.2% of drug expenditure.

Conclusions: The study depicted the items belonging to category I which requires top managerial control, also the items belonging to categories II and III which require control by middle and lower managerial level respectively.

Keywords: ABC, VED, ABC-VED matrix, Drug inventory

INTRODUCTION

Rational utilization of resources is an important aspect of functioning of all organizations including hospitals. In hospitals, it is important to utilize available funds as economically as possible without affecting quality of health care. Annual expenditure on drugs accounts for about 1/3rd of total annual hospital expenditure.^{1,2} With limited availability of financial resources, it is necessary to have balance between expenditure on drugs and demand for medicines. This balance can be achieved by following principle recommendations of drug inventory analysis which is required to be done from time to time. Drug inventory management leads to judicious allocation of resources for purchasing drugs, keeping in mind their costs and criticality. ABC (Always better control) and VED (Vital, essential and desirable) analysis are 2 different types of inventory control measures which depend upon cost and criticality of the drugs respectively.

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ABC-VED Matrix analysis takes both the above analyses in consideration and gives result based on economic as well as critical value of drugs simultaneously. It also classifies drugs into categories according to the priority of their control.

In this study, we have performed ABC, VED, and ABC-VED Matrix analysis of drug store of GMCH Aurangabad.

The objective of the study was to categorize the drugs based on cost and criticality aspects and identify those which require stringent managerial control.

METHODS

List of drugs purchased by drug store of GMCH Aurangabad along with their costs for the period of 12 months i.e. from April 2014 to March 2015 was obtained. The data was then transcribed in an MS Excel spread sheet. The statistical analysis was carried out using MS Excel statistical functions. For ABC analysis, total cost of each item was calculated by multiplying cost of each unit by the total quantity of that item. The drugs were arranged in descending order of their costs. Cumulative cost of the list was calculated. The drugs were then categorized according to their costs as per the ABC analysis. The drugs accounting for the top 70% expenditure were classified as category A, next 20% as category B and the last 10% as category C.³

For VED analysis, drugs were then classified into 3 categories according to their criticality, namely, Vital, Essential and Desirable.

Vitals: Items critically needed for the survival of patients and those that must be available at all times in the hospital, as their non-availability can seriously affect the image of the hospital.

Essential: Items with low criticality need and whose shortage may be tolerated for short period in the hospital.

Desirable: Item with lowest criticality, shortage of which would not be detrimental to health of patients.³

The VED status of each item was discussed with justification by faculty members.

The data from ABC and VED analysis was further used to perform ABC-VED matrix using the MS Excel worksheet. The drugs were classified into category 1; category 2 and category 3 based on their criticality and cost aspects (Table 1).⁴

Category 1 = AV + BV + CV + AE + AD

Category 2 = BE + CE + BD

Category 3 = CD

RESULTS

Table 1: ABC-VED matrix.

| | V | E | D | |
|---|----|----|----|--|
| Α | AV | AE | AD | |
| В | BV | BE | BD | |
| С | CV | CE | CD | |

The total number of the drug items used by the medical store was 119. The total drug expenditure was Rs. 4.08.53.968.

Table 2: ABC, VED and ABC-VED matrix results.

| | Drugs | Drugs % | Costs % |
|-------|-------|---------|---------|
| A | 20 | 16.8 | 70 |
| В | 26 | 21.8 | 20.1 |
| C | 73 | 61.4 | 9.9 |
| V | 42 | 35.3 | 34.3 |
| Е | 60 | 50.4 | 49.5 |
| D | 17 | 14.3 | 16.2 |
| Cat 1 | 57 | 47.9 | 82.3 |
| Cat 2 | 52 | 43.7 | 16.5 |
| Cat 3 | 10 | 8.4 | 1.2 |

Table 3: Comparison of various ABC, VED and ABC-VED matrix results.

| Category | Gupta et al ³ | Mahatme et al ⁵ | Junita et al ⁶ | Khurana et al ⁷ | Devnani et al ⁸ | Present study |
|----------|--------------------------|----------------------------|---------------------------|----------------------------|----------------------------|---------------|
| A | 14.6 | 14.5 | 7.74 | 3.45 | 13.78 | 16.8 |
| В | 22.4 | 18.2 | 11.01 | 6.9 | 21.85 | 21.8 |
| С | 63 | 67.3 | 81.25 | 89.65 | 64.37 | 61.4 |
| V | 7.4 | 24.2 | 6.6 | 32.41 | 12.11 | 35.3 |
| Е | 49.2 | 68.5 | 33.6 | 61.38 | 59.38 | 50.4 |
| D | 43.4 | 7.3 | 59.8 | 6.2 | 28.51 | 14.3 |
| Ι | 20.9 | 31.5 | 11.9 | 33.8 | 22.09 | 47.9 |
| II | 48.9 | 68.5 | 37.8 | 60 | 54.63 | 43.7 |
| III | 30.2 | - | 50.3 | 6.2 | 23.28 | 8.4 |

By ABC analysis, it was found that 16.8%, 21.8% and 61.4% items belonged to A, B and C category respectively, accounting for 70%, 20.1% and 9.9% of expenditure (Table 2 and Figure 1).

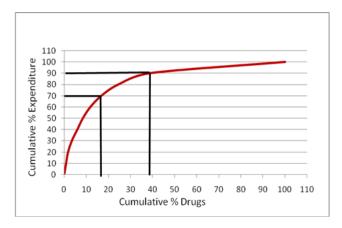


Figure 1: ABC analysis cumulative curve.

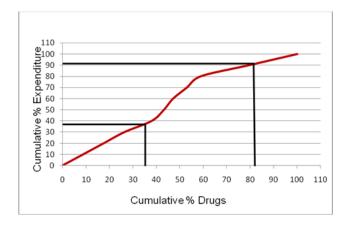


Figure 2: VED analysis cumulative curve.

VED analysis showed that 35.3%, 50.4% and 14.3% were V, E, and D category items respectively, accounting for 34.3%, 49.5% and 16.2% of expenditure (Table 2 and Figure 2).

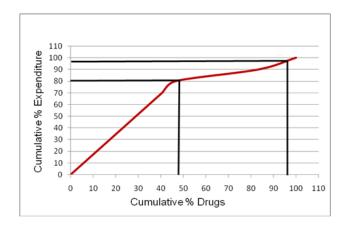


Figure 3: ABC-VED matrix analysis cumulative curve.

By ABC-VED matrix analysis, 47.9%, 43.7% and 8.4% were found to be category I, II and III items respectively, accounting for 82.3%, 16.5% and 1.2% of drug expenditure (Table 2 and Figure 3).

DISCUSSION

The drug formulary the health centre consisted of 119 items. The total annual drug expenditure on these 119 items was INR 4,08,53,968. Drug Inventory control is an important element of Health care management, and is an essential activity to achieve efficient patient care in a hospital. The regular availability of the necessary medicines is the topmost priority for any hospital. Each hospital has to evolve its own drug inventory analysis system depending on the population and the health care problems it caters. To avoid stock-outs as well as excess stocks, cost and criticality of the drugs are two important factors which have to be taken into account in drug inventory analysis7. ABC analysis and VED analysis which assess the cost and criticality respectively have been used in this study. An ABC-VED matrix helped us identify 57 drugs (47.9%), which consume 82.3% of total annual drug expenditure under Category I and require stringent control.

ABC analysis

In our study, 20 items (16.8%) in category A consume 70%, 26 items (21.8%) in category B consume 20.1% and 73 items (61.4%) in category C consume 9.9% of the total ADE. Considering ABC analysis alone will enable us to ensure adequate control over 16.8% of items which consume 70% of total annual drug inventory cost. But this analysis does not take into account the vital items in B and C categories.

VED analysis

VED analysis of the drug inventory in our study shows that, 42 items (35.3%) in vital category consume 34.3%, 60 items (50.4%) in essential category consume 49.5% and 17 items (14.3%) in desirable category consume 16.2% of the annual drug expenditure. When VED analysis is considered alone, the 5 desirable items included in category A and consume considerable cost are ignored.

An ABC-VED matrix provides a balanced classification of the drug inventory into 3 categories based on both cost and criticality of the items. In the present study, 57 items (47.9%) consuming 82.3% of the ADE belong to Category I, 52 items (43.7%) consuming 16.5% of the ADE belong to Category III and 10 items (8.4%) consuming 1.2% of the ADE belong to Category III. ABC-VED matrix enables us to apply stringent managerial control measures to the 57 items in Category I which are either expensive or vital. These drugs should always be maintained in stock since they are either vital or essential. But considering the high cost of these drugs,

a low buffer stock should be maintained and strict control should be exerted on the prescription and utilization of these drugs. Category II drugs can be controlled by the middle level management and Category III drugs can be controlled by lower managerial level. Appropriate ordering techniques should be employed for the different categories.

The comparison with similar studies in India is shown in Table 3.

CONCLUSION

Stringent Upper managerial control should be applied to Category 1 drugs and these should never be out of stock as they are either vital or essential. But considering the high cost of these drugs, a low buffer stock should be maintained and strict control should be exerted on prescription and utilization of these drugs. An effort should be made to bring down the number of AD items which take away a good chunk of the budget & there non-availability is not going to make much difference to quality of health care services.

Similarly, category 2 and category 3 drugs should receive middle and lower managerial control respectively.

The drug inventory analysis enabled the classification of drugs into categories based on their priority and assignment to appropriate managerial levels. This analysis should help promote effective management of drug inventory with minimal monetary resources while maintaining required safety stocks of high priority drugs and reduce frequency of drug supply shortage. This analysis should be performed every quarterly by the drug store to ensure efficient and judicious use of resources.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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