APPLICATION OF INVENTORY CONTROL TECHNIQUES FOR DRUG MANAGEMENT AT A RURAL HEALTH CENTRE

FS Vaz¹, AM Ferreira¹, I Pereira-Antao², MS Kulkarni¹ & DD Motghare¹

ABSTRACT

Objectives: To analyse the annual drug expenditure at a Rural Health Centre using ABC-VED analysis. Design: Inventory control techniques ABC, VED and ABC-VED matrix analysis were utilized to study the drug expenditure at the health centre. The data was collected for the financial year 2006-2007. Settings: a rural health centre in the State of Goa. Results: Out of the 113 drugs listed around 19.47% of the drugs were found to account for 68.96% of the annual drug expenditure (22 drugs) and were classified as A category drugs. Another 23.89% of the drugs (27 drugs) consumed 21.03% of the budget (B category), while the remaining 56.64% of the drugs (64 drugs) accounted for only 10.01% of the annual drug expenditure (C category). Twelve drugs (10.62%) were classified as Vital drugs, 44 drugs (38.94%) and 57 drugs (50.44%) were considered as Essential and Desirable drugs respectively. Based on ABC-VED matrix analyses around 30.09% of drugs were classified as category I, 42.48% were Category II drugs, while the remaining 27.43% drugs were category III drugs. Conclusion: The use of inventory control techniques in the primary health care setting could help in bringing about substantial improvement not only in patient care but also in form of optimal use of resources.

INTRODUCTION

The goal of any hospital supply system is to ensure that there is adequate stock of required items, so that uninterrupted supply of all essential items is maintained. Health care industry is a labor intensive organization. While salaries and fringe benefits account for roughly 60 percent of operating costs in a hospital, 30-35 percent of costs are incurred on materials and supplies like drugs etc. A logistic expenditure is possible on materials and supplies therefore, controlling these expenses¹.

A study conducted by the Department of Personnel and Administrative reforms in India has revealed that not only quantity of medicine received in the primary health centers falls short of their requirements but the supply is often erratic². Even common medicines are out of stock and remain so for a considerable period². Of the various explanations for non availability of even simple medicines in the third world countries, a large number are related to materials management³. The present study was conducted at a Rural Health Centre in Goa to study the drug management through the application of inventory control techniques like ABC, VED and ABC-VED matrix analysis. Since health sector perennially faces a resource crunch it is essential that health managers use scientific methods to maximize their returns from investment at a minimal cost.

METHODOLOGY

A study was conducted at a rural health centre in Goa to study the inventory control of drugs utilized for patient care, with a special focus on the drug expenditure. ABC, VED and ABC-VED matrix analysis techniques were utilized to study the drug expenditure at the hospital. The data was collected for the financial year 2006-2007. The annual consumption and expenditure incurred on each drug was obtained.

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ABC analysis: ABC cost analysis of all the drugs in the inventory of the hospital was done. The annual drug expenditure (ADE) of individual drugs was arranged in descending order. The cumulative cost of all the items was calculated. The cumulative percentage of expenditure was calculated as well as the cumulative percentage of number of items. Then this list was subdivided into three categories based on the cumulative cost percentage. Approximately, 10% of drugs consuming 70% of ADE constituted category A, 20% of drugs consuming about 20% value constituted category B while, the remaining 70% of drugs consuming 10% of ADE formed category C. The cutoffs were not exactly at 10/20/70 but differed marginally.

VED analysis: the VED criticality analysis of all the listed drugs was done by classifying the drugs into Vital (V), Essential (E) and Desirable (D) categories. The drugs critically needed for the survival of the patients and which must be available at all times were included in the Vital (V) category. The drugs with a lower criticality need and which may be available in the hospital were included in the Essential (E) group and the remaining drugs with lowest criticality, the shortage of which would not be detrimental to the health of the patients were included in the Desirable (D) group. The VED status of each individual drug was determined after discussion with the faculty from the Department of Pharmacology, Goa Medical College.

ABC-VED matrix: the ABC-VED matrix was formulated by cross tabulating the ABC and VED analysis. From the resultant combination three categories were classified (categories I, II and III). Category I was constituted by drugs belonging to AV, AE, AD, BV and CV sub-categories. The BE, CE and BD sub-categories constituted the category II and the remaining drugs in the CD sub category constituted the category III. In the above sub-categories the first alphabet denotes its place in the ABC analysis while, the second alphabet stands for its place in the VED analysis.

Priority system: To simplify the drugs management at the health centre a priority system was developed to narrow down on drugs requiring strict control. Sub-categories of ABC-VED matrix which accounted for more than 10% of the annual drug expenditure were classified as priority I drugs and the remaining were considered as priority II drugs.

The data was collected in pre designed formats. The data was then transcribed in a MS Excel spreadsheet. The statistical analysis was done using the MS Excel statistical functions.

RESULTS AND DISCUSSION

ABC Analysis: Out of the 113 drugs listed around 19.47% of the drugs were found to account for 68.96% of the annual drug expenditure at the Rural Health Centre (22 drugs) and were classified as A drugs. Another 23.89% of the drugs (27 drugs) consumed 21.03% of the budget (B category), while the remaining 56.64% of the drugs (64 drugs) accounted for only 10.01% of the annual drug expenditure (C category).

Another study in ESIC, New Delhi following findings were reported on ABC analysis: about 20% of items were classified as A items consuming 75.9% of the total budget. Around 40% of items classified as Category B consumed 18.8% of the budget. Remaining 40% of the items were classified as C items and consumed only 5.2% of the total budget.

VED Analysis: Twelve drugs (10.62%) were classified as vital drugs. Around 44 drugs (38.94%) of drugs were considered as essential, while 57 drugs (50.44%) were classified as desirable drugs. Vital drugs accounted for only 2.87% of the annual drug expenditure of the Rural Health Centre. Essential drugs accounted for 57.77% of the drug expenditure, whereas desirable drugs were found to consume 39.36% of the annual expenditure.
There could be serious functional dislocation of patient care when vital drugs are not available even for short period. Therefore vital drugs should always be stocked in sufficient quantity to ensure their constant availability. This group of drugs must be controlled and monitored with greatest care.

The shortage of essential can be tolerated for a short period. If these essential drugs are not available for a few days or a week, functioning of the hospital can be adversely affected (Drugs like antibiotics). These drugs should also be controlled and monitored carefully. The shortage of desirable drugs would not adversely affect the patient care or hospital functioning even if shortage is prolonged (Drugs like vitamins). Thawani VR et al\textsuperscript{4} in their analysis in a teaching hospital reported following findings: Around 23.8\% of drugs (53 items) were classified as Vital, another 38.1\% (85 items) were classified as Essential and remaining 38.1\% (85 items) were classified as Desirable. Sikdar SK et al\textsuperscript{6} in their study in CGHS reported that 15 items (5.1\%) were found to be Vital, 172 items (58.1\%) were classified as essential and 109 items (36.8\%) were considered desirable.

ABC-VED Analysis:

Table 1 describes the ABC-VED matrix analysis in detail. The table allows for detailed description of the various sub-categories according to expenditure and number of drug items. Such analysis helps to study the ABC, VED and ABC-VED matrix at the same time. Every drug store/pharmacy must prepare a table of this nature which could be an important tool in effective drug management.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|c|c|c|}
\hline
\textbf{A} & \textbf{B} & \textbf{C} & \textbf{Total} \\
\hline
\textbf{ADE} & \% & \textbf{No. of Drugs} & \textbf{ADE} & \% & \textbf{No. of Drugs} & \textbf{ADE} & \% & \textbf{No. of Drugs} & \textbf{ADE} & \%
\hline
V & 0 & 0 & 0 & 4704 & 1.99 & 3 & 2081 & 0.88 & 9 & 6785 & 2.87 & 12
\hline
E & 112584 & 47.67 & 12 & 14542 & 6.16 & 8 & 9315 & 3.94 & 24 & 136441 & 57.77 & 44
\hline
\hline
\textbf{Total} & 162885 & 68.96 & 22 & 49645 & 21.03 & 27 & 23640 & 10.01 & 64 & 236188 & 100 & 113
\hline
\end{tabular}
\caption{ABC-VED Matrix analysis of the drugs at Rural Health Centre for the Year 2006-2007}
\end{table}

Table 2 shows categories of drugs based on ABC-VED matrix analysis and the corresponding drug expenditure. Around 30.09\% of drugs were classified as category I and accounted for 71.84\% of the total drug expenditure. Another 42.48\% of drugs were considered as category II drugs and were found to consume 22.98\% of the total drugs budget. The remaining 27.43\% drugs were classified as category III drugs and these accounted for 5.18\% of the total drug expenditure. This categorization of Drugs based on ABC-VED matrix analysis helps in identifying group of drugs needing strict monitoring and control.

Thawani et al\textsuperscript{4} in their study in Nagpur hospital reported that 29.15\% drugs belonged to category I and consumed about 79\% of the budget. Category II was constituted by 41.26\% of the drugs accounting for 17.3\% of the total drug expenditure, while the remaining 29.59\% of drugs were classified as category III drugs accounting for just 3.7\% of the drug expenditure.

Priority System: Based on the ABC-VED matrix analysis a priority system was devised to optimize the list of drugs requiring strict monitoring (Table 3).
Priority I included only 38 drugs which together consumed almost 81.84% of the expenditure. This category included only three ABC-VED matrix sub-categories i.e. AE, AD and BD, each sub-category accounting for more than 10% of Annual Drug Expenditure. Priority II consisted of the remaining 75 drugs accounting for only 18.16 of the annual drug expenditure. The priority classification narrowed down the drugs requiring good control to just 38 items thus simplifying monitoring and control strategies for the management of drugs at the health centre.

Table -3 : Priority system based on ABC-VED Matrix analysis of the drugs at Rural Health Centre for the Year 2006-2007

<table>
<thead>
<tr>
<th>Priority Category</th>
<th>No. of Items</th>
<th>Percentage of Items (%)</th>
<th>Percentage of Annual Expenditure (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>38</td>
<td>33.63</td>
<td>81.84</td>
</tr>
<tr>
<td>II</td>
<td>75</td>
<td>66.37</td>
<td>18.16</td>
</tr>
<tr>
<td>Total</td>
<td>113</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

CONCLUSION

The use of inventory control techniques in the primary health care setting could help in bringing about substantial improvement not only in patient care but also in form of optimal use of resources.

REFERENCES