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Research Article

Inventory control for drugs used in the urban training centre of a tertiary care hospital, Kolkata, West Bengal, India

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ABSTRACT

Background: Proper utilization of resources is of utmost importance in any health care establishment, because resources are limited. Scientific methods should be developed so that investment at a minimal cost can yield maximum returns. This can only be achieved by inventory control. The present study was conducted in the urban training centre of a tertiary care hospital where ABC and VED analysis of all categories of drugs used were done to identify the drug supply and utilization pattern.
Methods: Drug expenditure of the urban training centre under the department of community medicine of R. G. Kar Medical College and Hospital was analyzed using the ABC-VED matrix economic analysis from April 2012 to March 2013.
Results: The total annual drug expenditure from April 2012 to March 2013 was Rs.52194.89.On ABC analysis it was found 12.50% of drugs fall under category A accounting for 70.82% of total expenditure, 21.87% and 65.63% of the drugs fall under category B and C respectively which accounted for 19.90% and 9.28% of annual expenditure for drugs. VED classification, done after discussion with the medical officer revealed 21.87% drugs as vital,50% drugs as essential and 28.13% drugs as desirable drugs. ABC-VED matrix analysis revealed 28.12% drugs were Category I whereas 53.13% and 18.75% drugs belonged to Category II and Category III drugs respectively.
Conclusions: ABC and VED analysis techniques need to be routinely adopted for optimal utilization of drugs and to avoid out-of-stock position.

Keywords: ABC analysis, VED analysis, ABC-VED matrix, Inventory control

INTRODUCTION

To ensure uninterrupted supply of drugs and the required items, an adequate stock should be maintained by hospital supply systems. Recent advances in health care systems have hugely increased the expenditure on delivery of services. It has been estimated that materials and supplies like drugs etc. accounts for 30-35 per cent operating costs in a hospital. Thus controlling these expenses will lead to a logistic expenditure on hospital supply system.[1] This can be achieved by efficient management of medical store. Priority setting is necessary particularly for purchase and utilization of drugs. Also efforts should be there for close supervision of essential drugs and avoid any wastage.

A study has found that appropriate control measures for high cost drugs lead to 20% savings in the budget of a medical store.[2] Department of Personnel and Administrative Reforms in India conducted a study and it was found that the medicine which are received by primary health centres fall short of the demand and also the erratic supply system is responsible for out-of-stock position of the common drugs.[3]

This non-availability of drugs particularly in the developing countries is due to lack of proper material management.[4] Thus inventory control becomes essential for optimal utilization of resources which will ultimately ensure better patient care in health care establishments.[5] Among the various inventory control methods available, the most commonly used method in the medical store is ABC-VED matrix analysis.

ABC analysis is also known as "Always Better Control". Pareto's theory states that 70 % of the total expenditure is incurred on 10% items (Group A). Again 20% of the total budget is accounted by 20% items (Group B), whereas the remaining 10% of the budget is consumed by 70% of the items (Group C).

The criticality of an item is determined by VED analysis (Vital, Essential, Desirable items). Vital items constitute those items, non-availability of which will completely disrupt the functioning of health care facility, essential items comprise of the items which, when not available, the health care facilities though function, the quality of services get seriously affected, whereas desirable items are those without which the health care centres can still function properly without affecting the quality of services.[6]

On coupling the results of ABC and VED analysis, ABC-VED matrix can be constructed, according to which the drugs are classified into three categories. Category I consist of AV, BV, CV, AE, AD subgroups which are either vital or expensive. Category II consist of the BE, CE, BD subgroups, Category III includes CD subgroup which is the desirable and less expensive group.[5]

The present study was conducted in the Urban Training Centre under the Department of Community Medicine of R. G. Kar Medical College and Hospital and ABC, VED and ABC-VED matrix analysis was done to identify the drugs which need greater supervision for their management and control.

METHODS

The present study was conducted in the Urban Training Centre under the Department of Community Medicine of R. G. Kar Medical College and Hospital. The Urban Training Centre provides community health services in the urban field practice area of the department. The general outpatient department, immunization, family planning and maternal and child health services are delivered to the people through the Urban Training Centre. The total annual drug expenditure and consumption of drugs from April 2012 to March 2013 were noted.

ABC analysis was done by first calculating total annual expenditure of each of the drugs and then unit cost was multiplied by annual consumption and finally the resulting figures were arranged in descending order. The cumulative cost, cumulative percentage of expenditure along with cumulative percentage of number of items was also calculated. The classification of the drugs into A, B and C category was done according to the percentage of cumulative cost they consumed. (70% for category A, 20% for category B, and remaining 10% for category C drugs respectively).

The VED classification was done after discussing with the medical officer of the Urban Training Centre and the drugs were then classified into vital, essential and desirable category.

The results of ABC and VED analysis were cross-tabulated and the resultant ABC-VED matrix was formulated. Accordingly the drugs were classified into three categories (I,II and III).The drugs belonging to AV, AE, AD, BV and CV subcategories constituted category I drugs.

Category II drugs included the BE, CE and BD subcategory drugs whereas Category III dugs comprised of the CD subcategory of drugs. The first alphabet of each subcategory stands for the category according to ABC analysis while the second one denotes position in VED classification.

RESULT

32 drugs were enlisted in the drug list of the Urban Training Centre. Rs 52,194.89 was total annual expenditure incurred on drugs from April 2012 to March 2013. ABC analysis revealed that 12.5% (4) drugs belonged to Category A drugs, whereas 21.87% (7) and 65.63% (21) drugs were of Category B and Category C drugs respectively.

It was found that Category A drugs accounted for 70.82% (Rs 36,967.66) Category B drugs for 19.90% (Rs.10390.84) and Category C drugs for 9.28% (Rs4836.39) of annual expenditure of the Urban Training Centre (Table 1).The values differed marginally from 70%, 20% and 10% which is within permissible limits.[7]

VED analysis revealed that 21.87% (7) drugs belonged to V Category drugs, whereas 50% (16) and 28.13% (9) drugs were of E and D category drugs respectively. It was found that V Category drugs accounted for 20.97% (Rs 10951.07) E Category drugs for 47.13%(Rs.24597.09) and D Category drugs for 31.90% (Rs 16646.73)of annual expenditure of the Urban Training Centre.(Table 1).

ABC-VED matrix analysis was then done and the drugs were classified into the following categories:

Category I: AV+BV+CV+AE+AD—2+2+3+1+1 =9 (28.12%)
Category II: BE+CE+BD----3+12+2=17(53.13%)
Category III: CD=6 (18.75%) (Table 2).

On ABC-VED matrix analysis, 28.12% drugs were of Category I consuming 79.48% of total annual expenditure, 53.13% drugs was of Category II consuming 18.87% of total annual expenditure while the remaining 18.75% were Category III drugs consuming 1.65% of total annual expenditure (Table 2).

Table 1: ABC-VED matrix analysis for drugs used at urban training centre from April 2012 To March 2013.

Category	A		B		C			Total expenditure in Rs.
	No. of drugs (combined category) (%)	Annual Expenditure In Rs (%)	No. of Drugs (combined category)	Annual Expenditure In Rs (%)	No. of drugs (combined category)	Annual Expenditure In Rs (%)	Total no. of drugs (%)	
V	2(AV)	6427.50 (12.31)	2 (BV)	2993.45 (5.73)	3 (CV)	1530.12 (2.93)	7 (21.87)	10951.07 (20.97)
E	1(AE)	18365.94 (35.18)	3 (BE)	3782.67 (7.25)	12 (CE)	2448.48 (4.70)	16 (50.0%)	24597.09 (47.13)
D	1(AD)	12174.22 (23.33)	2 (BD)	3614.72 (6.92)	6 (CD)	857.79 (1.65)	9 (28.13)	16646.73 (31.90)
Total Expendi Ture in Rs (%)	4(12.50)	36967.66 (70.82)	7 (21.87)	10390.84 (19.90)	21(65.63)	4836.39 (9.28)	32 (100)	34756.19 (100)

Table 2: ABC-VED matrix analysis of the drugs at the urban training centre from April 2012 to March 2013.

Category	No. of drugs	% of drugs	% of annual expenditure
I	9	28.12	79.48
II	17	53.13	18.87
III	6	18.75	1.65
Total	32	100	100

DISCUSSION

It was found from the present study that out of 32 drugs, 70.82% of the annual expenditure is consumed by 4 (12.5%) drugs (Group A), 19.90% is consumed by 7 (21.87%) drugs (Group B) and the remaining 9.28% of the total budget is consumed by 21 (65.63%) drugs (Group C).

The study conducted by Thawani et al in a teaching hospital in Nagpur, revealed that 69 % of total budget was consumed by 10.8 % of drugs, 20.8 % of budget was consumed by 20.6 % drugs and the remaining 10.2 % of budget was consumed by 68.6 % drugs.[8]

In the study conducted by Sikdar et al in the medical stores depot of the Central Government Health Scheme (CGHS), New Delhi (1996) it was found that 70% of drug expenditure was incurred on of 17.8% items (category A) while 20% and 10% of the expenditure were incurred on 22.6% (category B) and 59.6% (category C) items respectively.[9] In a study conducted by Gandhi and Basur in the Employees' State Insurance Corporation (ESIC), New Delhi, also showed similar findings.[10] According to the study, around 20 per cent of items accounted for 75.9 per cent of the total annual drug expenditure,(category A), around 30 per cent items consumed 18.8 per cent of total expenditure (category B) while 50 per cent of the items accounted for only 5.2 per cent of the total expenditure. Similar findings were also reported in the study conducted in central drug stores under New Delhi Municipal Committee according to Bhushan et al.[11]

VED analysis revealed that 21.87% (7) drugs belonged to V Category drugs, whereas 50% (16) and 28.13% (9) drugs were of E and D drugs respectively. It was found that V Category drugs accounted for 20.97% (Rs 10,951.07) E Category drugs for 47.13% (Rs.24597.09) and D Category drugs for 31.90% (Rs 16646.73) of annual expenditure of the Urban Training Centre. The study by Thawani et al conducted in a teaching hospital found that 23.8 % of drugs were of vital nature while the essential and desirable categories contain 38.1% of drugs each.[8] In the study by Sikdar et al. (1996)[9]conducted in the CGHS it was found that 5.1%, 58.1% and 36.8% drugs were vital, essential, and desirable items respectively.

Similar studies accross the country conducted in different settings found that percentage of vital, essential and desirable items vary widely.[5,6] The different service

profiles, difference in opinion of medical officers and speciality services of different institutes may be a cause of such wide variation in the percentage of vital, essential and desirable items in different settings. If ABC analysis alone is considered, the drugs from Group A (4 drugs) can be effectively controlled but the availability of vital drugs of B and C category will get hampered.

If VED analysis is considered alone, the vital and essential drugs can be controlled effectively, but Category A contains desirable items which should also be taken into account. From ABC-VED matrix analysis, it is found that Category I consists of 9 (28.12%) drugs (AV, AE, AD, BV and CV), Category II consists of 17 (53.13%) drugs (BE, CE, BD) and Category III consist 6 (18.75%) drugs (CD). The management of the drugs belonging to Category I is important for keeping a strict control on the annual expenditure as well as their availability. Of the Category I drugs, the AV, AE and BV subgroups contain 5 drugs (15.62%) which are not only expensive but also consist of vital and essential items. So out-of-stock situation cannot be accepted for these drugs and a low buffer stock should be maintained while there should be tight control on the level of consumption and stock in hand. This can be achieved by two bin method of ordering. CV categories consisting of 3 (9.38%) drugs are low cost drugs but however they consist of vital items. Due to the low carrying cost, these items can be ordered once a year while maintaining an adequate stock.

AD items again consist of 1 (3.12%) item but they contain desirable items, without which, the functioning of the health facilities will not get affected. However as these drugs consume a substantial amount of the annual budget, the drugs in this subgroup should be used rationally and efforts should be made to reduce the number of items in this group. Category II consists of 17 drugs, the management of which helps in continuous supply of all the essential drugs. Category III consists of 6 drugs of the CD subgroup, which are again low cost drugs of desirable category. Thus Category II and Category III drugs if procured once or twice a year and stocked, it will be possible to save on ordering cost and at a low carrying cost. The results of ABC-VED matrix analysis are similar to another study where it is seen that category I, category II and category III consist of 21%, 56%, and 22% items respectively.[9] The study by Thawani et al in a Nagpur hospital found that category I consisted of 29.15% drugs which consumed and 79% of the budget. Category II and category III consisted 41.26% and 29.59% of the drugs, consuming 17.3% and 3.7% of the total drug expenditure respectively.[8]

CONCLUSION

Inventory control techniques are essential for management of stock inventory in pharmacy stores, priority setting in purchase and distribution of drugs and other items and maintaining a strict vigilance on different category of drugs. Thus the use of ABC-VED analysis help in optimal utilisation of resources while ensuring uninterrupted supply of drugs which ultimately help in improving the quality of services in any health care setting.

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